| MEMO ROUTING SLIP | NEVER USE FOR APPROVALS, DISAPPROVALS, CONCURRENCES, OR SIMILAR ACTIONS | | |
|---|---|---|---|
| 1 NAME OR TITLE SSJ | INITIALS | | CIRCULATE |
| ORGANIZATION AND LOCATION | DATE | | COORDINATION |
| 2 | | | FILE |
| | | | INFORMATION |
| 3 | | | NECESSARY ACTION |
| | | | NOTE AND RETURN |
| 4 | | | SEE ME |
| | | | SIGNATURE |

REMARKS

1. For your information and for members of your staff per direction of General Greer.

2. Since this report was made in connection with a DOD directed study relating to incentive contracts based on reliability, it may help by pointing out present pitfalls which lead to a pratfall as far as legal liability on the part of Contractors go.

| FROM NAME OR TITLE | DATE |
|---|---|
| JOHN R. DONNELLY, MAJOR, USAF | 7 Feb 62 |
| ORGANIZATION AND LOCATION | TELEPHONE |
| SSJ - Staff Judge Advocate | 3682 |

DD FORM 1 FEB 50 95 Replaces DA AGO Form 896, 1 Apr 48, and AFHQ Form 12, 10 Nov 47, which may be used.

R & N 5-1
Ueh 1110

DRAFT

Capt Diener/jm

DISCOVERER XXVII (322/1110) Incident

1. Following is a chronological sequence of events concerning the CEA, leading up th the subject incident:

| | | |
|---|---|---|
| a. | 13 Apr 61 | Missile 322 arrived at VAFB. |
| b. | 17 Apr 61 | CEA removed to DAC LAB for c/o. |
| c. | 1 May 61 | C/o on CEA in LAB in progress. |
| d. | 10 May 61 | Pitch network removed for rework. |
| e. | 29-30 May 61 | Pin 17 on P601 found broken. Therefore, an advanced EO was written changing the pitch rate function to the ME to Pin 38 on P601 and its receptacle J601 Hole 38 (EO 2796676 AC). This plug connects the programmer board to the rest of the CEA chassis. |
| f. | 30 May 61 | LAB checkout of CEA complete (per DAC Procedure 7797779). |
| g. | 2 Jun 61 | CEA removed from can in RIM for control checks. |
| h. | 7 Jun 61 | CEA re-installed in missile and sealed. |
| i. | 5 Jul 61 | CEA removed from missile on pad ans sent to LAB for flight trajectory installation and spin motor monitor mods. |
| j. | 10-11 Jul 61 | Programmer board SN F60030 was replaced by SN F60012 due to an intermittant relay, a loose roll control pot, and some chafed wires. Complete checkout of the CEA was completed per 7797779. |
| k. | 13 Jul 61 | CEA reinstalled in Missile 322 on pad. |
| l. | 14 Jul 61 | Rate gyro sensing tests with main engine disconnected and A/S check completed. |
| m. | 20 Jul 61 | R-1, all systems check completed. Rate gyro sensing check was included with the missile disconnected. |

2. The CEA (Flight Controller) has contained within it the timer (tape) and programmer board. The attitude gyros are also contained within the CEA plug the rest of the circuitry. External to the CEA are the rate gyros. The plug and receptacle

DRAFT

601 are located within the CEA. The 8mfd condenser which is also suspected is internal to the CEA, but extended to the programmer board. It is connected across the Plug 601.

3. The checkout of the CEA following the programmer change on 10 Jul was covered by DAC inspection and the technician performing the checkout. Both indicated that the pitch circuit to the ME was satisfactory. During this check, an external simulated rate voltage is placed on the rate circuitry. The output from the CEA is connected to meters on the checkout console. This voltage is steady and continues to be registered on the meters until removed.

There is no paper which would indicate that the P60 plug on the new programmer was changed to be compatible with the J601 and in the CEA chassis nor vice-versa. Since the programmer board was a standard item it would appear that Pin 17 on P601 went into an empty receptacle on J601 since this wire had been removed to hold 38 on J601 previously.

4. Conclusion: It is impossible to state whether the configuration was on Plug 601 at liftoff, since tests state that it was and paperwork indicates that it was not. It is believed by the writer that a technician probably made a modification to Plug 601 during checkout and was not covered by paperwork. Since it would have been an unauthorized modification, there is very little chance that it will ever be admitted.

WILLIAM E. BIBNER
Captain, USAF

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MISSILE MISHAP INVESTIGATION COMMITTEE REPORT

Discoverer X

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[redacted]

HEADQUARTERS
AIR FORCE BALLISTIC MISSILE DIVISION
FIELD OFFICE
Post Office Box 1567
Vandenberg Air Force Base, California

Vehicle 1054 Historical File

UNCLASSIFIED

REPORT OF MISSILE MISHAP

DISCOVERER X

1695

BY

MISSILE MISHAP INVESTIGATING COMMITTEE

UNCLASSIFIED

19 FEBRUARY 1960

The following signatures indicate concurrence with the contents contained herein.

E. M. THOMPSON, MAJOR, USAF
Hq AFBMD Fld Ofc, VAFB, Calif
Chairman

R. R. MOORE, MAJOR, USAF
Hq AFBMD, Los Angeles 45, Calif
Member

VALDEAN WATSON, MAJOR, USAF
Hq 1st Missile Div, VAFB, Calif
Member

R. B. LERSTAD, CAPTAIN, USAF
Hq AFBMD Fld Ofc, VAFB, Calif
Member

R. W. PURDY
VAFB Project Engineer
Douglas Aircraft Company, Inc
Member

J. F. WILLIAMS
Supervisor, Vehicle Systems Section
Lockheed Missile Space Division
Member

W. E. DIENER, CAPTAIN, USAF
Hq AFBMD Fld Ofc, VAFB, Calif
Recorder

CLASSIFICATION CHANGED TO [redacted]

By Authority of 205-2

By [illegible] APR 1966

DOWNGRADED AT 3 YEAR INTERVALS
DECLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

WDGEV-60-3-54

UNCLASSIFIED

~~SECRET~~ [redacted]

RW FORM 127

[redacted]

HEADQUARTERS AFBMD FIELD OFFICE
Vandenberg Air Force Base, California
29 February 1960

MISSILE MISHAP INVESTIGATION COMMITTEE REPORT

Discoverer X

AUTHORITY:

In accordance with the intent of AFBMDIR 11-7, dated 16 December 1958, an investigating committee was appointed by the Chief, AFBMD Field Office, Vandenberg Air Force Base (VAFB), California, to investigate the missile mishap which occurred on 19 February 1960 and resulted in the destruction of Discoverer X (Vehicle Numbers 1054/223). (See Attachment A).

SCOPE:

This investigation was conducted within the limitations of the information, capabilities, and facilities directly available to this committee at Vandenberg Air Force Base.

FLIGHT HISTORY:

Discoverer X was launched from Launch Emplacement 75-3-5 at VAFB at approximately 1215 P.S.T., 19 February 1960. Immediately after lift-off oscillations developed in the pitch plane. The oscillations became more pronounced and the missile began to exceed the prescribed range safety limits. The Missile Flight Safety Officer commanded missile destruction which resulted in missile destruct at approximately 21,000 feet altitude, 56 seconds after lift off. (See Attachment B). Major pieces were tracked by radar and cameras and impacted in the immediate area of the launch operation and up to 1½ miles south. A detailed description and plotting of pieces is provided in Attachment C.

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

[redacted]

[redacted]

INVESTIGATION AND ANALYSIS:

1. Examination of the post-launch films revealed clearly that the observed oscillations were about the pitch axis. Telemetry records indicated pitch program commands were being generated properly. The pitch rate of the vehicle was determined from telemetry records of both the Thor booster and the Agena second-stage. Thor records showed definite evidence of low gain in the pitch rate circuitry. The values recorded on telemetry were approximately one-tenth of the value which was calculated for the pitch rate from independent data sources in either stage of the vehicle. The low gain in the pitch rate circuitry reduced the damping in this axis to a level which resulted in instability after introduction of the normal disturbances associated with launching. As a result of the above evidence, the investigation was narrowed to the Control Electronics Assembly of the Thor booster and to any elements external to it that may have caused this assembly to perform abnormally.

2. A review of the pitch rate circuitry (See Attachment D) and the telemetry pick-off point resulted in isolation of the abnormality to one or more of the following:

a. The pitch rate gyro and associated circuitry.

b. The pitch rate AC amplifier-demodulator.

c. The shaping network (or summing network).

d. A condition introduced into the control circuits by telemetry.

3. The above components of the pitch rate circuit were recovered from the wreckage and examined within the capabilities at this station. The pitch rate gyro was checked for continuity when it appeared to have no flourolube leaks. However the rotor would not spin upon application of power; the gyro



[redacted]

RW FORM 127

was then released to Douglas Aircraft for further examination at other locations. The AC amplifier demodulator had impact damage to several circuit elements and was also released for further examination after physical inspection. (See Attachment E). The shaping network components and the resistors between the gyro and the amplifier-demodulator were checked and found to be within tolerance. The recovered telemetry package was checked as functional by the 704th Instrumentation Squadron. This committee then shipped it to the Test and Activation Office, Headquarters AFBMD, for test and evaluation.

4. The possibility of the malfunction having been caused by conditions or events prior to launch, nonadherence to published procedures and documents, or personnel error were thoroughly investigated by the committee. No evidence of any of these factors affecting the cause of the incident was found.

a. The following Douglas Aircraft Company records were checked and cross-checked.

(1) Removal cards on Missile 223 and C.E.A. 5214 and all engineering orders associated with either.

(2) RIM Building and launch emplacement checkout procedures (DAC Drawings 7733825, F Change, dated 13 August 1959 and 7733816, K Change, dated 8 February 1960) and Preparation of Missile 223, DAC Drawing 7796330, D Change, dated 26 February 1960. (See Attachment F).

(3) Inspection records of tests required and accomplished by the above procedures and the qualifications of the personnel accomplishing same.

b. Examination of the above records indicates that Missile 223 experienced an unusually long time period at VAFB prior to launch:

(1) Arrival at VAFB - 30 July 1959.

(2) Missile checkout began 26 August 1959.

(3) Final CEA gain check - 2 October 1959.

(4) RIM checkout complete - 14 October 1959.

(5) Missile on Stand - 30 November 1959.

(6) MOS of Agena 1054 - 9 February 1960.

(7) Launch - 19 February 1960.

c. The records show a CEA operating time of approximately 29 hours. However, with additional running time in the electrical laboratory it is estimated that the unit had approximately 40 hours of operating time at this location. The CEA had been removed and reinstalled four times for incorporation of changes and checks.

d. There was no evidence of any unusual performance of Ground Support Equipment which could have caused this malfunction.

5. A review of all failure reports at VAFB concerning the suspect elements in the pitch rate circuitry was conducted using Douglas records for Discoverer and Air Force Records for the WS115A. In addition AMCTSO obtained pure statistical information from SBAMA on WS115A failures in the United Kingdom. Verbal information indicates a total of 16 failures associated with the rate gyros and the rate gyro assembly in the United Kingdom. Only two failures of rate gyros have been recorded at VAFB. In addition, the CEAs in Discoverer IX and X have been forerunners in a program which requires more modifications to be made at the vendor (RCA) rather than on site by Douglas personnel. No significant trends in changes or failures were established.

6. Since the only electrical interference between the two vehicles is through the command destruct system, photography was the primary means of determining whether any interference from the upper stage could have influenced the course of events.

[redacted]

a. Attachment G lists the significant events noted on the 70mm launch film. Sequentially these were as follows:

(1) Immediately after lift-off, at orbital stage umbilical ejection, a small amount of acid fumes was noted issuing from the ground half of the acid fill point. This was a normal occurrence.

(2) Although not noted on Attachment G, a smoky projectile was next noted in the vicinity of the missile. The exact source of this projectile is unknown; however, it is believed to be a ricocheting vernier engine ignitor. There is no known reason to believe that this item contributed to the failure.

(3) The next item observed, again not noted on Attachment G, was what appeared to be the gaseous nitrogen flex line to the payload falling to the ground. This is a normal disengagement of this item.

(4) At about 9.7 seconds after lift off a small object appeared to fall from the missile as it rose. However, no specific part can be identified. Since this event occurred after the oscillations began it was concluded that it did not contribute to the incident.

(5) At about 9.7 seconds after lift-off a series of vapor clouds appeared to emit from the orbital stage. This may be explained by the fact that due to the unusual pitching of the vehicle, the fluid level in the UDMH (Unsymmetrical Dimethyl Hydrazine) tank covered the vent valve connector in the tank allowing fuel to enter the feed line and vent valve. Liquid in the pilot section of the vent valve was thus ejected overboard causing the large volumes of vapor noted.

(6) Although not noted on Attachment G, at approximately 36 seconds after lift off it appears that a door from the booster guidance



[redacted]

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section was ripped off. This could be due to a combination of the excessive oscillations of the missile and aerodynamic forces. This again was determined to have no bearing on the cause of the incident.

b. The possibility of an orbiting stage ullage rocket igniting at lift off and damaging the CEA and associated wiring was investigated. Visual inspection of the wreckage in the area around the ullage rocket exhaust nozzle eliminated this possibility.

c. The Lockheed records concerning Agena Vehicle No. 1054 were also thoroughly checked. No open paperwork was found. Spot checks of significant items removed or installed during the period immediately preceding launch were made; no discrepancies were found.

7. Because of the mid-air destruction of these vehicles several items involving safety were investigated by this committee.

a. All traces of Unsymmetrical Dimethyl Hydrazine (UDMH) and Inhibited Red Fuming Nitric Acid (IRFNA) found during the recovery and salvage operation were negligible and presented no safety hazard. Laboratory tests revealed that in 10 minutes time all trace of UDMH was dissipated from mild exposure metal surfaces and that four hours was the maximum for traces of IRFNA. Six personnel at Point Arguello, who picked up pieces, were treated with a neutralizing agent as a precautionary measure.

b. During recovery, pieces of magnesium-thorium alloy stamped "radioactive" were picked up for disposal. These alloys are used in the Agena vehicle and the LMSD adapter section. Magnesium-thorium alloy has radioactive thorium in its content. This alloy does not pose an external radiation hazard; however, it is an alpha radiation emitting element and thus





W FORM 127

is potentially hazardous. Recovery and salvage of fragments of Discoverer X did not take into account this alpha radiation until a stamped piece was discovered. Subsequent collection and disposal of these pieces were handled by the Lockheed organization in accordance with industrial practice.

c. The area immediately adjacent to the Control Center 75-3, on which the four diesel generators and the diesel fuel storage tank are located drains toward the main access door of the control center. Should the 6,000 gallon diesel storage tank be ruptured, a quantity of the diesel fuel could contaminate the interior of the control center.

FINDINGS:

1. The malfunction which caused Discoverer X to exceed missile safety limits and to be destroyed by command destruct was isolated to the pitch rate circuitry of the Control Electronic Assembly of the Thor booster. This committee found no evidence that the malfunction was caused by personnel error, non-adherence to procedures, improper procedures, design deficiency, nor an inadequate inspection system. Checks and investigations of various components at this location have failed to reveal a specific cause for the malfunction.

2. The time between final CEA gain checks and launch of the missile amounted to 140 days. The missile on stand time amounted to 81 days. There are no formal requirements for calendar time nor operating time periodic inspections on the Thor booster in this program.

3. There is no evidence that the second stage Agena vehicle contributed in any way to this incident.

4. Doubt has been raised as to the effectiveness with which pertinent failure histories from the [redacted] have been made known to





BW FORM 127

Headquarters AFBMD for application to Thor boosters.

5. Routine and special procedures connected with an investigation of an incident of this type had not been established.

6. The fuels and oxidizers presented no safety hazard during this operation.

7. There was an original general unawareness of magnesium-thorium alloy in Discoverer X and at present there is a lack of specific hazard potential, if any, associated with this alloy.

8. A potential hazard exists in Control Center 75-3 in event of the rupture of its diesel fuel storage tank.

RECOMMENDATIONS:

1. That the investigations now underway at various locations continue on an expedited basis to determine whether a component failure existed in the pitch rate gyro or its associated amplifier demodulator. These investigations should be conducted under the supervision provided by the established project channels.

2. That the Discoverer program be reviewed to determine what checks are required, at what frequency, in the event extensive delays are encountered in the receipt-of-missile to launch sequence.

3. That Headquarters AFBMD insure that a positive system is in operation whereby failure reports from the WS115A program are reviewed for applicability to the Thor booster.

4. That general standard procedures be established for the conduct of proceedings of incident/accident boards to include membership, conduct of investigation, recovery and parts disposition, security control, and documentation. These procedures will involve actions by the AFBMD Field

Office, 1st Missile Division, and contractors.

5. That physical handling of salvaged and recovered parts be denied for a period of four hours (except specified recovery items handled by team members) to insure that no safety hazard exists. This does not include identification and location of parts.

6. That the AFBMD Field Office establish the hazards associated with magnesium-thorium alloy and that procedures be established through the project office for the safe handling and disposition of this alloy.

7. That a dike be constructed around the diesel fuel storage tank to isolate spillage of diesel fuel at Control Center 75-3.

7 Atchs:
1. Atch A: Ltr Order, Subj: Missile Mishap Investigation Committee w/ Amend, dtd 1 Mar 60 (U)
2. Atch B: 704th IS MFSO (DASMC-60-956) (V-2-60-555) (S)
3. Atch C: DAC ltr, Subj: Dispersal & Impact Areas of Msl 223/1054, A31-260-DM18-M-061 (V-3-60-601) (C)
4. Atch D: Discoverer Msl 200 & Subs; Pitch & Yaw Attitude & Rate (DAC) (V-3-60-600) (C)
5. Atch E: AC Amplifier Photo (U)
6. Atch F: DAC Drawing 7796330 (U)
7. Atch G: Data Engr Report on Msl 223, pgs 11 & 12, DAC (V-3-60-599) (S)

HEADQUARTERS
AIR FORCE BALLISTIC MISSILE DIVISION
FIELD OFFICE
Post Office Box 1567
Vandenberg Air Force Base, California

Reply to
Attn of: WDGEV

23 February 1960

SUBJECT: Missile Mishap Investigating Committee

TO: See distribution

1. This letter confirms verbal orders of 19 February 1960 appointing a committee to investigate the missile mishap which occurred on that date with Discoverer vehicle 1054/223. The committee will investigate the cause of the test mishap and render a report of findings and recommendations to the Chief, AFBMD Field Office.

2. The committee shall consist of the following personnel:

Major Earl M. Thompson, 16860A, AFBMD/FO, Chairman
Major Richard R. Moore, 19795A, AFBMD, Member
*Major Valdean Watson, AO 743877, 1st MD, DS, Member
Captain William E. Diener, 44522A, AFBMD/FO, Recorder
Captain Roy B. Lefstad, 40573A, AFBMD/FO, Member
**Mr. W. E. Carrier, Mgr VAFB Engr, Lockheed, Member
**Mr. R. W. Purdy, Project Engr Thor Systems, Douglas, Member

*Indicates with concurrence of commander concerned.
**Indicates with concurrence of contractor concerned.

FOR THE COMMANDER:

JOSEPH J. GODY, JR.
Colonel, USAF
Chief, AFBMD Field Office

DISTRIBUTION:
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1 - Comdr AFBMD, AF Unit PO, Los Angeles 45, Calif
1 - Comdr, 1st Missile Division, VAFB, Calif
1 - Lockheed Missiles and Space Div, PO Box 1506, VAFB, Calif
1 - Douglas Aircraft, PO Box 1596, VAFB, Calif

Atch. 1

HEADQUARTERS
AIR FORCE BALLISTIC MISSILE DIVISION
FIELD OFFICE
Post Office Box 1567
Vandenberg Air Force Base, California

REPLY TO
ATTN OF: MDGEV

1 March 1960

SUBJECT: Missile Mishap Investigating Committee

TO: See distribution

Reference is made to letter, subject as above, dated 23 February 1960 appointing Committee to investigate missile mishap. Paragraph 2 of subject letter is amended to include the name of Mr J. F. Williams, Vehicle Systems Section Supervisor, Lockheed, Member vice Mr W. E. Currier, Mgr VAFB Engr, Lockheed, Member.

FOR THE COMMANDER:

JOHNNY J. BODY, JR.
Colonel, USAF
Chief, AFBMD Field Office

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1 - Douglas Aircraft, PO Box 1596, VAFB, Calif

[redacted]

704TH INSTRUMENTATION SQUADRON
UNITED STATES AIR FORCE
Vandenberg Air Force Base, California

REPLY TO
ATTN OF: 704ISC

25 FEB 1961

SUBJECT: Transmittal of MFSO Report, Discoverer Vehicle "DERBY DAY"

TO: 1 Missile Div (DS) 1 Missile Div (DO, Attn: Maj Skaggs)

AFBMD Field Office (Attn: Lt Col Bones)

1. Attached is the MFSO Report on Discoverer Vehicle "DERBY DAY".

2. This letter is unclassified when the attachment is withdrawn.

LUCIUS A. PERRY JR.
Colonel, USAF
Commander

1 Atch
as stated

[redacted]

[redacted]

[redacted]

DASMC-SC

Atch 2

70[illegible]TH INSTRUMENTATION SQUADRON
United States Air Force
Vandenberg Air Force Base, California

[illegible]IAL ORDERS)
[illegible] 10) 17 [illegible]

[illegible] following named officers and [illegible] appointed to positions indicated [illegible] [illegible]onal duty. AUTHORITY: [illegible] Division Operations [illegible] [illegible]OVERER-59, [illegible]

[illegible] EUGENE B. MOODY, [illegible] Missile Flight Safety [illegible]
[illegible] Flight Safety [illegible]
[illegible]ROLD F. ALVEN, [illegible] Flight Safety Officer
[illegible] MARTIN BINKIN, [illegible] Flight Safety Officer
[illegible] W. RABEY [illegible] Safety Officer
[illegible] M. KERLICK, [illegible] Flight Safety [illegible]
HORACE E. MOODY, [illegible] Telemetry Control Officer
LEONARD M. SITES, [illegible] Telemetry Control Officer
MELVIN J. [illegible], [illegible] Console Operator

[illegible] The Alternate Senior Missile Flight Safety Officer will be present at the [illegible] and must concur in any destruct action.

[illegible] concurrence of [illegible] concerned.

[illegible]RIBUTION:
[illegible] INDIV
[illegible] DO
[illegible] 70[illegible]IS

/S/ [illegible] PERRY JR
[illegible] PERRY JR
[illegible] USAF
[illegible]

[illegible]FY THIS IS A
[illegible]

[illegible], CAPT, USAF

[redacted]

# MEMORANDUM

DATE: 26 February 1960
A31-260-DM18-M-061

TO: Chairman, Missile 223 Incident Review Board

FROM: R. W. Purdy, A31-260

SUBJECT: DISPERSAL & IMPACT AREA OF MISSILE 223/1054

COPIES TO:

Missile 223/1054 was launched from 75-3-5 on 19 February 1960 at approximately 12:15 PM. A command destruct signal was transmitted after approximately 56 seconds of flight. Missile 223/1054 had attained approximately 21,000 feet in altitude and was proceeding in a northerly direction.

At time of liftoff, surface winds were 12 to 19 knots from 330°. Wind at 20,000 feet was 46 knots from 340° and at 30,000 feet was from 330° at 62 knots.

Attached chart indicates areas of search and recovery also distance from 75-3-5. Attached detailed lists indicate, in Area "A", major items found and respective weights, in areas "B" thru "F" smaller items and weights. At completion of search, 4657 pounds of Missile 223/1054 had been recovered, which is approximately 67% of total weight.

R W Purdy

R. W. Purdy, A31-260
Project Engineer
THOR Systems

RWP/cw
Attachments - 4

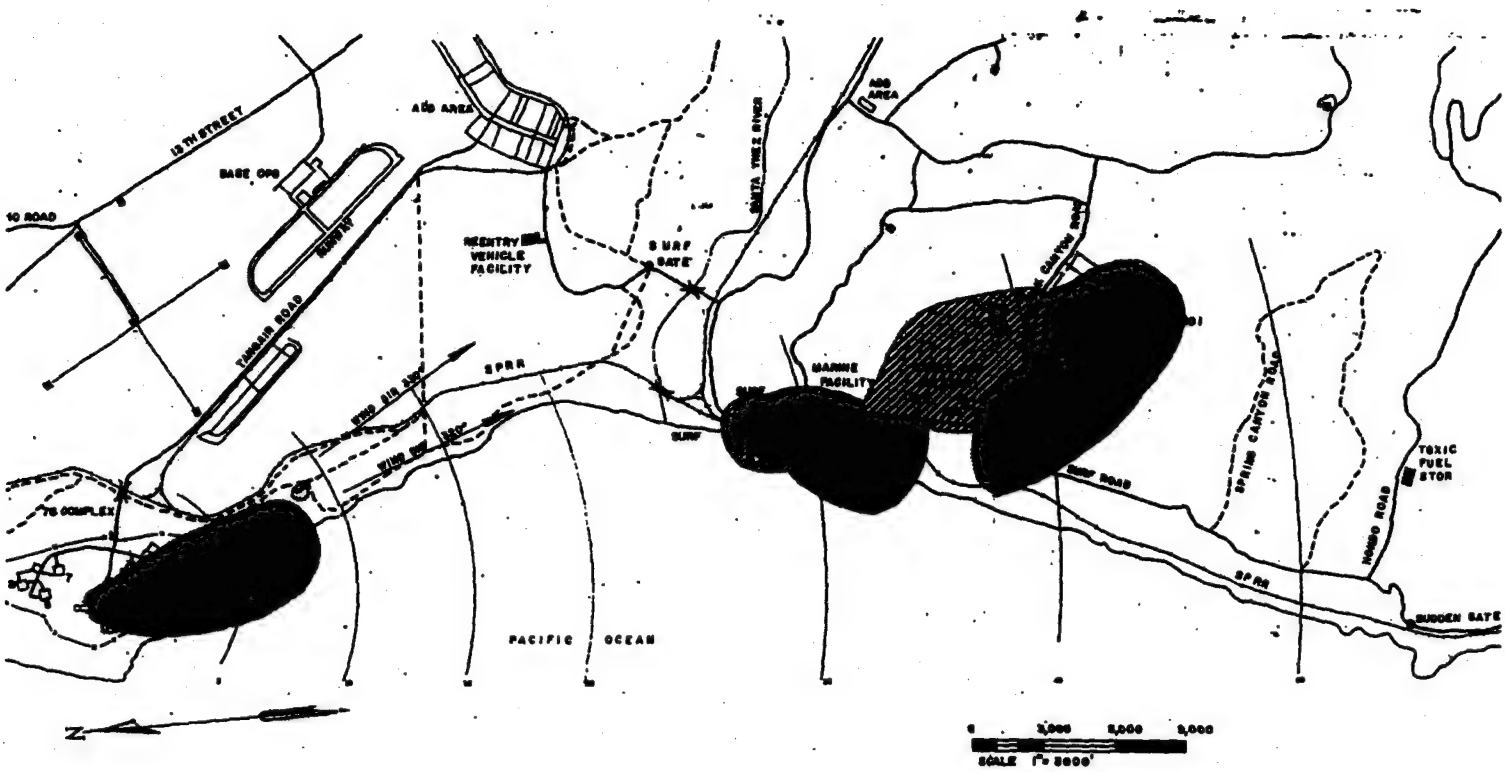
THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 AND 794. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

[redacted]

| PART | WEIGHT | | I.D. NUMBERS |
|---|---|---|---|
| AREA "A" | Actual | Average | (On Area "A" Only) |
| Main Engine | 1402.0 | | 19 |
| $LO_2$ Line | 6.7 | | 24 |
| CEA | 102.0 | | 1 |
| Guid Section | 988.0 | | 21 |
| Nitrogen Line | 8.3 | | 25 |
| Right Hand Vernier Engine | 95.5 | | 26 |
| Access Door | .5 | | 27 |
| LMSD | Not available | | 28 |
| Turbo Pump & G.G. | 505.0 | | 2 |
| High Press Bottle (1) | 45.0 | | 3 |
| High Press Bottle (1) | 46.0 | | 5 |
| Fuel Duct Pipe | 36.2 | | 4 |
| Fuel Duct Pipe | 180.6 (filled with sand) | | 7 |
| $LO_2$ Start Tank | 38.4 | | 22 |
| Fuel Screen | 32.6 | | 23 |
| Fuel Start Tank | 27.6 | | 6 |
| $LO_2$ Vent Valve | 20.1 | | 29 |
| Hydraulic Pump Assem | 20.6 | | 30 |
| Missile Center Section | 545.0 | | 20 |
| AREA "B" | | | |
| 4 pcs $LO_2$ Tank Skin | | 22.0 | |
| 7 pcs Fuel Tank Skin | | 7.0 | |
| 2 pcs Engine Section | | 5.0 | |

| PART | WEIGHT | | I.D. NUMBERS |
|---|---|---|---|
| AREA "C" | Actual | Average | (On Area "A" Only) |
| 3 pcs LMSD Prop Tank | | 3.5 | |
| 13 pcs $LO_2$ & Fuel Tank Skin | | 1.0 | |
| 1 pc LMSD Retro Fairing | 0.9 | | |
| 1 pc Engine Access Door | 5.1 | | |
| 2 pcs $LO_2$ Tank Skins | | 24.0 | |
| 8 pcs $LO_2$ & Fuel Tank Skins | | 5.7 | |
| 1 pc Fiber Glass Tunnel Cover | 0.7 | | |
| 1 pc $LO_2$ Tank Skin | 19.7 | | |
| 1 pc LMSD Skin | 0.3 | | |
| 1 pc $LO_2$ Tank Skin | 6.8 | | |
| 1 pc $LO_2$ Tank Skin | 14.6 | | |
| 1 pc Fuel Tank Skin | 18.2 | | |
| AREA "D" | | | |
| 7 pcs Engine Section | | 1.9 | |
| 14 pcs $LO_2$ & Fuel Tank Skin | | 9.3 | |
| 1 pc LMSD Skin | 0.8 | | |
| AREA "E" | | | |
| 1 pc LMSD Adapter | 10.7 | | |
| 1 pc LMSD Retro Cover | 1.6 | | |
| 1 pc Drip Shield | 0.1 | | |
| 1 pc Tank Skin | 4.3 | | |
| 1 pc Tank Skin | 17.7 | | |

| PART | WEIGHT | | I.D. NUMBERS |
|---|---|---|---|
| AREA "F" | Actual | Average | (On Area "A" Only) |
| 1 pc $LO_2$ Tank Skin | 13.8 | | |
| 1 pc Fuel Tank Skin | 30.4 | | |
| 1 pc $LO_2$ Tank Skin | 14.0 | | |
| 1 pc Engine Section Skin | 0.3 | | |
| 1 pc Engine Section Skin | 1.7 | | |
| 1 pc Engine Section Skin | 0.5 | | |


13TH STREET
10 ROAD
BASE OPS
TANGAIR ROAD
ADD AREA
REENTRY VEHICLE FACILITY
SURF GATE
SANTA YNEZ RIVER
ADD AREA
SPRR
SURF
MARINE FACILITY
SURF ROAD
SPRING CANYON ROAD
TOXIC FUEL STOR
HONDO ROAD
SPRR
SUDDEN GATE
PACIFIC OCEAN
SCALE 1" = 3000'

FORM 25-S-1 (REV. 8-53)

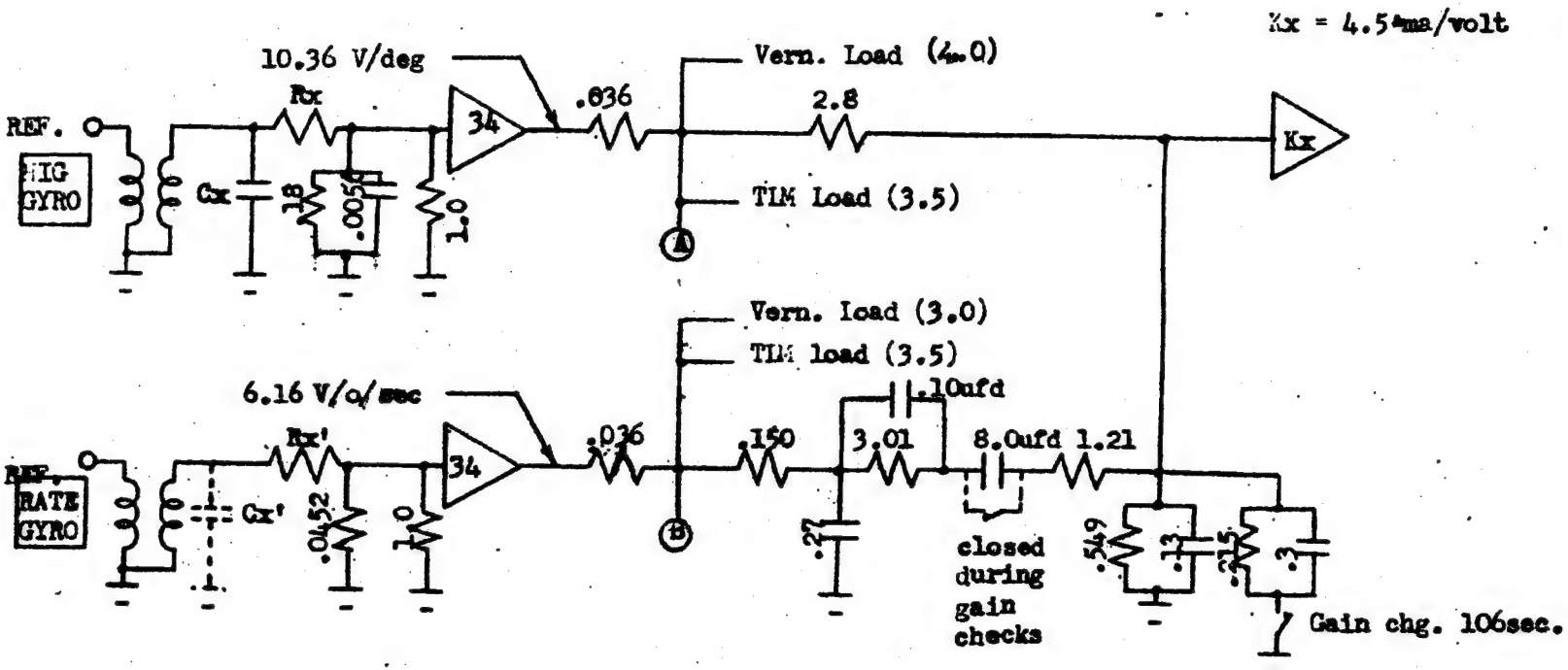
PREPARED BY:
CHECKED BY:
DATE:
TITLE:

# DOUGLAS AIRCRAFT COMPANY, INC.

Discoverer Missile 200 & Subs DIVISION

Pitch and Yaw Attitude & Rate

PAGE: 4
MODEL:
REPORT NO:

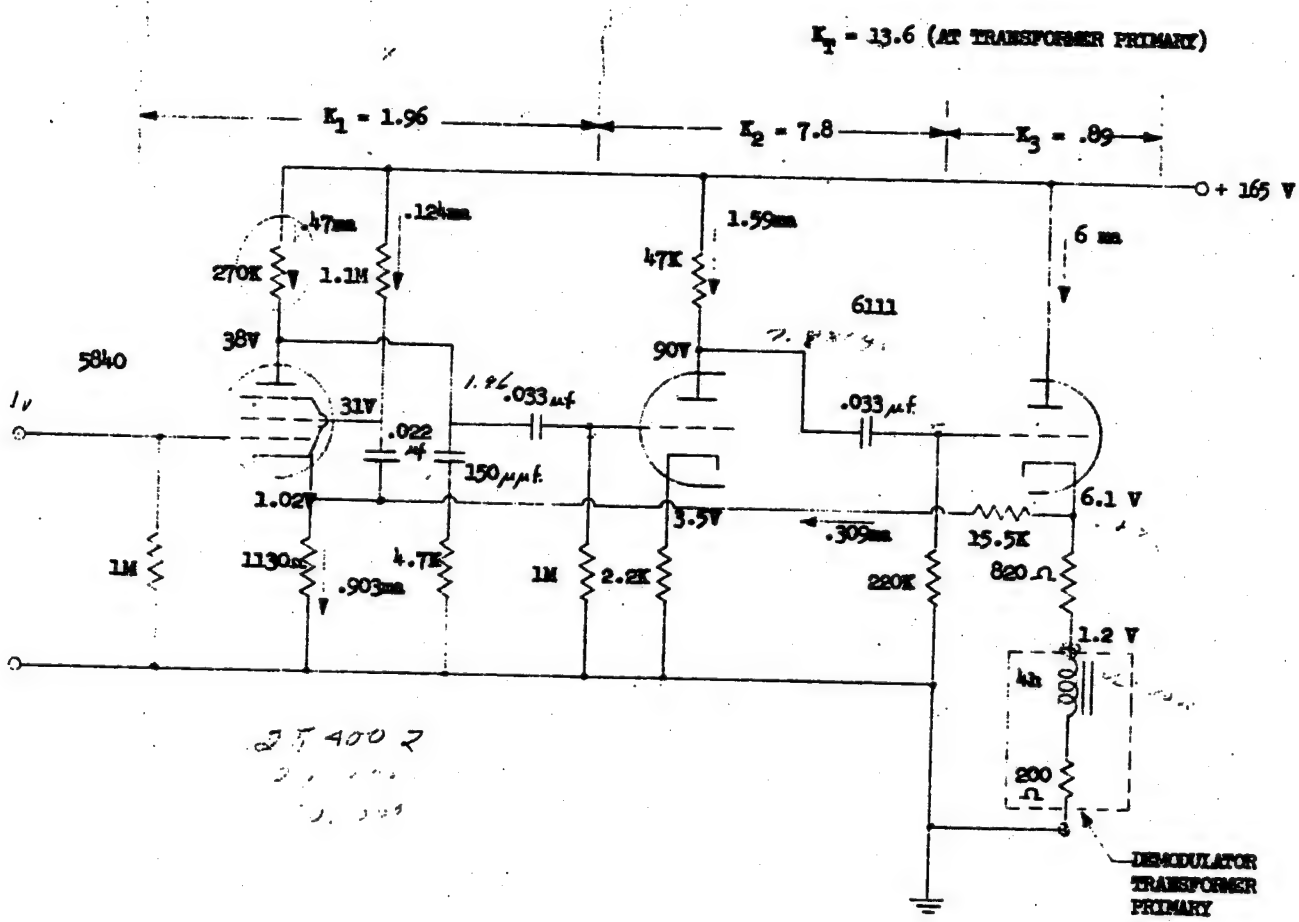



1. Add Cx to eliminate positive restraint of HIG gyro (usually .01 or .009 ufd).
2. Adjust Rx to give 10.15 V/deg at test point (A).
3. Cx' = (line capacitance when gyros are in Guidance Section)
4. Adjust Rx' to give 6.04 Volts/Degree/Second at test point (B)

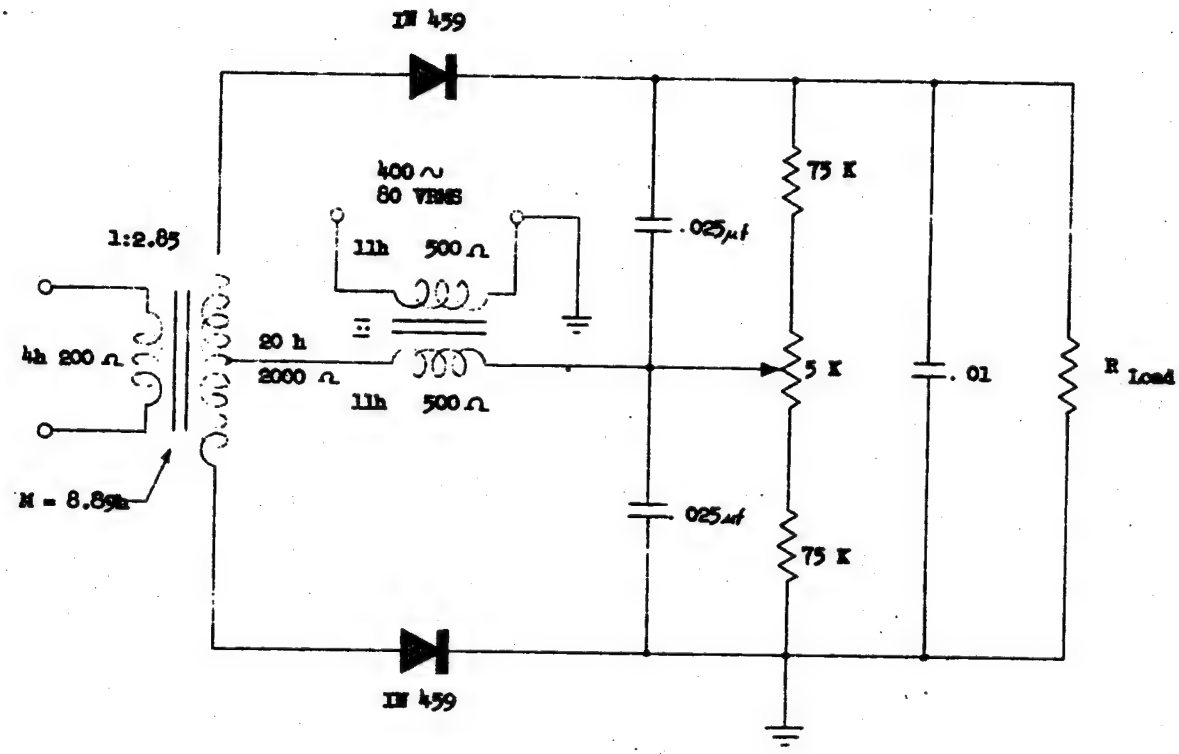
THIS DOCUMENT CONTAINS INFORMATION AFFECTING THE NATIONAL DEFENSE OF THE UNITED STATES WITHIN THE MEANING OF THE ESPIONAGE LAWS, TITLE 18, U.S.C., SECTIONS 793 AND 794. ITS TRANSMISSION OR THE REVELATION OF ITS CONTENTS IN ANY MANNER TO AN UNAUTHORIZED PERSON IS PROHIBITED BY LAW.

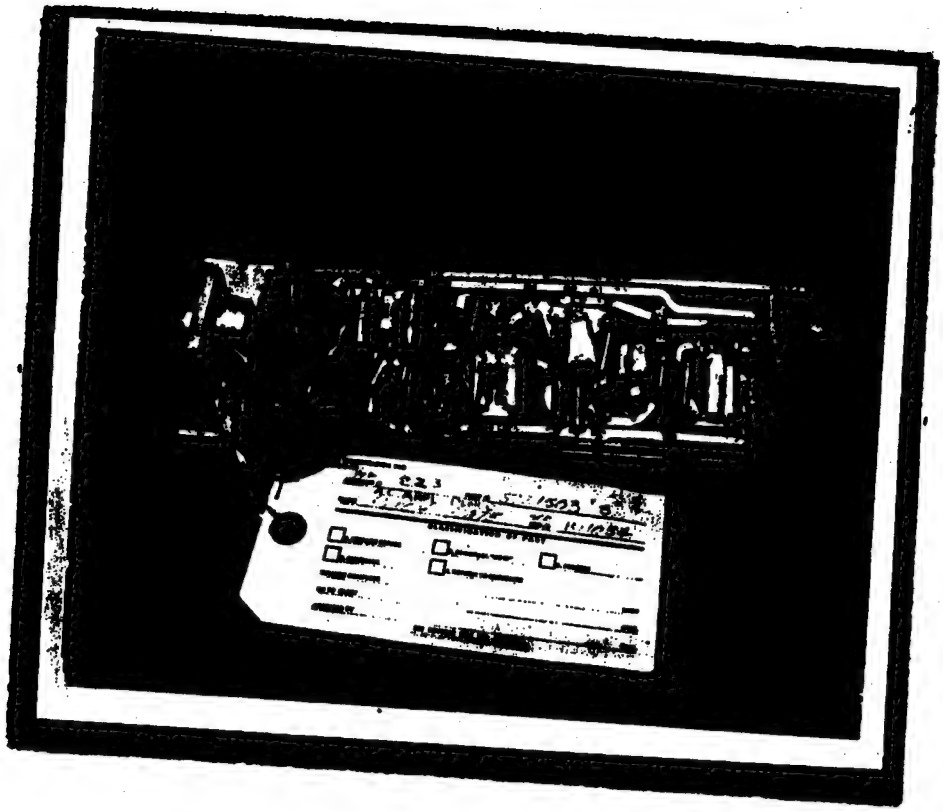
V-5-60-600

IOC CEA AC AMPLIFIER WITH FEEDBACK



IOC CRA DEMODULATOR





PITCH RATE A.C. AMPLIFIER DEMODULATOR

A 7796330

| FINISH SPECIFICATION | APPLICATION | | QTY REQD | | REVISIONS | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | NEXT ASSEMBLY | USED ON | NEXT ASSY | FINAL ASSY | SYM | DESCRIPTION | DFTSM | DATE | APPROVAL |
| | ~~~ | DM-18 | | | A | SEE E.O. | THURBER | 10/24/9 | [illegible] |
| | | | | | B | SEE E.O. | MAFLEY | 12-14-9 | [illegible] |
| | | | | | C | SEE E.O. | BARRY | 2-23-0 | REB |

D SEE E.O PG 1.1

ISSUED FOR USE AT VAFB ONLY

Model DM 1812-3

UNLESS OTHERWISE SPECIFIED
DIMENSIONS ARE IN INCHES
TOLERANCES ON
FRACTIONS ± DECIMALS ± ANGLES ±
BREAK SHARP EDGES

FIRST RELEASE OF PRINTS OCT 1 '59

ORIGINAL DATE OF DRAWING

ORIG SECT

| | | |
|---|---|---|
| CUST | | |
| MATL | Dalton | 9 |
| WT CHK | Dalton | 9 |
| STR CHK | [illegible] | 9-21-9 |
| CHECK | Dalton | 9 |
| PR ENGR | Dalton | 9 |
| DES ENGR | [illegible] | [illegible] |
| GR ENGR | Dalton | 9-29-9 |
| DFTSM | [illegible] | [illegible] |

Preparation of Missile #223

SCALE

WT ACT CALC LB

DOUGLAS AIRCRAFT COMPANY, INC.
SANTA MONICA DIVISION
SANTA MONICA, CALIFORNIA

DWG SIZE A

7796330

PAGE 1.0

25-1234 (7-56).

DOUGLAS

DRAWING NO. 7796330

PAGE NO. 1.1

CHANGE LETTER D

REVISIONS (CONTINUED FROM TITLE PAGE)

| SYM | DESCRIPTION | DFTSM | DATE | APPROVAL | SYM | DESCRIPTION | DFTSM | DATE | APPROVAL |
|---|---|---|---|---|---|---|---|---|---|
| D | SEE E.O. | HEWATT | 2-26-0 | RBB | | | | | |

2 345 (7-56)

DOUGLAS AIRCRAFT CO., INC. SANTA MONICA DIVISION

# PAGE & CHANGE LETTER INDEX

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PAGE NO. 8.0
CHANGE LETTER D

| PAGE NO. | CHG. LET. | PAGE NO. | CHG. LET. | PAGE NO. | CHG. LET. | PAGE NO. | CHG. LET. |
|---|---|---|---|---|---|---|---|
| 1.0 | D | | | | | | |
| 1.1 | D | | | | | | |
| 2.0 | D | | | | | | |
| 3.0 | C | | | | | | |
| 3.1 | D | | | | | | |
| 4.0 | C | | | | | | |
| 5.0 | C | | | | | | |
| 5.1 | C | | | | | | |
| 6.0 | C | | | | | | |
| 7.0 | C | | | | | | |
| 8.0 | C | | | | | | |
| 9.0 | C | | | | | | |
| 10.0 | C | | | | | | |
| 11.0 | C | | | | | | |
| 12.0 | C | | | | | | |

DOUGLAS

DRAWING NO. 7796330
PAGE NO. 3.0
CHANGE LETTER C

L-260-256 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 1-9-9 | 2795437 | A | GUID DC J-BOX RWK | AE | | * |
| 2-3-9 | 2795196 | A | RWK INTER PLUG P1 | AE | 8-20-9 | |
| 2-4-9 | 2795754 | New | INERTIA SWITCH REMOVAL | AE | 10-8-9 | |
| 3-9-9 | 2733628 | B | TURBINE OVERSPEED TRIP SWITCH MOD | AE | 8-25-9 | |
| 3-11-9 | 2795192 | A | ECHO MSL CONTINUITY CHECK | AE | 9-23-9 | |
| 3-11-9 | 2795192 | Memo | ECHO MSL CONTINUITY CHECK | AE | 9-23-9 | |
| 3-12-9 | 2795437 | Memo | GUID DC J-BOX RWK | AE | | * |
| 3-18-9 | 2795192 | B | ECHO MSL CONTINUITY CHECK | AE | 9-23-9 | |
| 3-24-9 | 2733619 | M | ECHO MSL PREP AT RIM PRIOR TO C/O | AE | 9-21-9 | |
| 4-1-9 | 2733619 | N | ECHO MSL PREP AT RIM PRIOR TO C/O | AE | 9-21-9 | |
| 4-2-9 | 2796147 | New | GUID & CONT LOCK WIRING RWK FOR 117L MSL | AE | 8-19-9 | |
| 4-29-9 | 2796342 | New | DISABLE FUEL DUCT BLANKET HEATERS | AE | 9-1-9 | |
| 5-5-9 | 2795437 | Memo | GUID DC J-BOX RWK | AE | | * |
| 5-6-9 | 2733619 | P | ECHO MSL PREP AT RIM PRIOR TO C/O | AE | 9-22-9 | |
| 5-13-9 | 2795734 | G | WIRING RWK MECO CIRCUIT | AE | | * |
| 6-4-9 | 2795196 | Memo | RWK INTER PLUG P1 | AE | 8-20-9 | |
| 6-4-9 | 2795734 | Memo | WIRING RWK MECO CIRCUIT | AE | | * |
| 6-4-9 | 2796473 | New | 117L GUID SECT MOD | AE | 9-11-9 | |
| 6-15-9 | 2796516 | New | WIRING RWK ENG CIRCUIT | AE | 8-20-9 | |
| 6-16-9 | 7795955 | C | 117L INVERTER C/O PROC | AE | 8-4-9 | # |
| 6-26-9 | 2733993 | AA | AO CANC | AE | 7-30-9 | |
| 6-29-9 | 2795734 | Memo | WIRING RWK MECO CIRCUIT | AE | | * |
| 7-14-9 | 7733825 | D | C/O PROC FOR 117L MSL | AE | 10-24-9 | # |
| 7-20-9 | 2795041 | K | CUT PROG TAPE FOR 117L MSL | AE | 9-22-9 | |
| 7-25-9 | 2795660 | New | WIRING RWK ECHO MSL | AE | 9-2-9 | |
| 7-25-9 | 2733993 | Memo | AO CANC | AE | 7-30-9 | |
| 7-30-9 | 2796625 | C | RATE GYRO RELOCATION 117L | AE | 8-18-9 | |
| 7-30-9 | 2796626 | A | RATE GYRO WIRING RWK 117L | AE | 9-11-9 | |
| 8-7-9 | 7795164 | A | CERT PROC, SONOTONE BATT | AE | 12-3-9 | # |
| 8-12-9 | 7733816 | F | C/O PROC DM 1812-3 L/E | AE | 2-11-0 | # |
| 8-13-9 | 2796473 | Memo | 117L GUID SECT MOD | AE | 8-19-9 | |
| 8-14-9 | 2795660 | A | WIRING RWK ECHO MSL | AE | 8-17-9 | |
| 8-14-9 | 2796625 | D | RATE GYRO RELOCATION 117L | AE | 8-18-9 | |
| 8-17-9 | 7733825 | E | C/O PROC FOR 117L MSL | AE | 10-24-9 | # |
| 8-20-9 | 7733825 | F | C/O PROC FOR 117L MSL | AE | 10-24-9 | # |
| 8-25-9 | 2796675 | New | ECHO GYRO NETWORK CALIB | AE | 9-22-9 | |
| 8-28-9 | 2796473 | Memo | 117L GUID SECT MOD | AE | 9-11-9 | |
| 8-31-9 | 2795041 | Memo | CUT PROG TAPE FOR 117L MSL | AE | 9-22-9 | |
| 9-3-9 | 2795437 | B | GUID DC J-BOX RWK | AE | 9-4-9 | |
| 9-8-9 | 2796676 | C | RWK 5793467 FLIGHT CONT | AE | 9-22-9 | |
| 9-10-9 | 2796676 | D | RWK 5793467 FLIGHT CONT | AE | 9-22-9 | |
| 9-14-9 | 2796676 | F | RWK 5793467 FLIGHT CONT | AE | 9-22-9 | |
| 9-14-9 | 7796701 | New | PITCH PROG RESISTOR ADJ | AE | 9-22-9 | |
| 9-15-9 | 2796725 | New | RWK 100% FLOAT SWITCH | AE | 9-29-9 | |
| 9-15-9 | 7796708 | KB | FUNCT TEST PROC FOR 5793467 FLIGHT CONT | AE | 9-22-9 | |
| 9-15-9 | 7733816 | G | C/O PROC DM 1812-3 L/E | AE | 2-11-9 | # |
| 9-17-9 | 2733619 | R | ECHO MSL PREP AT RIM PRIOR TO C/O | AE | 9-23-9 | |
| 9-29-9 | 2795041 | LM | CUT PROG TAPE FOR 117L MSL | AE | 10-23-9 | |
| 10-6-9 | 2795754 | Memo | INERTIA SWITCH REMOVAL | AE | 10-8-9 | |
| 10-6-9 | 7795712 | G | C/O PROC MSL ENG MB-3 BLK 1 | AE | 10-8-9 | |
| 10-16-9 | 2733993 | AB | AO CANC | AE | 10-8-9 | * |
| 10-17-9 | 2796793 | New | RWK CABLE TO PLUG P1 | AE | 2-10-9 | |
| 10-19-9 | 2795196 | B | RWK INTER PLUG P2 | AE | 10-21-9 | |
| 10-19-9 | 2796807 | New | RWK MSL FLIGHT CONT | AE | 10-26-9 | |

* NOT APPLICABLE - # ACCOMPLISHED BY FIELD STATION A.O.

DOUGLAS

DRAWING NO. 7796330
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CHANGE LETTER D

L-260-226 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 10-20-9 | 2796814 | New | RWK MSL | AE | 11-5-9 | |
| 10-20-9 | 2796676 | J | RWK 5793467 FLIGHT CONT | AE | 10-20-9 | |
| 10-20-9 | 7796701 | C | PITCH PROG RESISTOR ADJ | AE | 10-22-9 | |
| 10-20-9 | 7733825 | Vari | C/O PROC FOR 117L MSL | AE | 10-24-9 | # |
| 10-21-9 | 2795041 | Memo | CUT PROG TAPE FOR 117L MSL | AE | 10-23-9 | |
| 10-23-9 | 2796804 | New | INTER BONDING - ECHO | AE | 2-10-0 | |
| 10-23-9 | 2795041 | M | CUT PROG TAPE FOR 117L MSL | AE | 10-26-9 | |
| 10-26-9 | 2796473 | A | 117L GUID SECT MOD | AE | 10-30-9 | |
| 11-10-9 | 2795041 | Memo | CUT PROG TAPE FOR 117L MSL | AE | | * |
| 11-25-9 | 7733816 | H | C/O PROC DM 1812-3 L/E | AE | 2-11-0 | # |
| 12-31-9 | 2796625 | E | RATE GYRO RELOCATION - 117L | AE | | * |
| 12-31-9 | 2795754 | Rwk | INERTIA SWITCH - REMOVAL | AE | | * |
| 1-19-0 | 7733816 | J | C/O PROC DM 1812-3 L/E | AE | 2-11-0 | # |
| 1-26-0 | 2796997 | Memo | RWK MSL AC AMPLIFIER DEMOD | AE | 1-27-0 | |
| 2-1-0 | 2733831 | P | MSL C/O AT LAUNCH EMPL | AE | 2-12-0 | |
| 2-10-0 | 7733816 | K | C/O PROC DM 1812-3 L/E | AE | 2-11-0 | # |
| 2-10-0 | 2733993 | AK | AO CANC | AE | | * |
| 2-11-0 | 2733831 | Memo | MSL C/O AT LAUNCH EMPL | AE | 2-12-0 | |

* NOT APPLICABLE

# ACCOMPLISHED BY FIELD STATION A.O.

DOUGLAS

DRAWING NO. 7796330
PAGE NO. 4.0
CHANGE LETTER C

L-260-256 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 1-3-9 | 2733242 | C | C/O PROC MSL INSTR | INSTR | 8-27-9 | |
| 1-13-9 | 2733242 | D | C/O PROC MSL INSTR | INSTR | 8-27-9 | |
| 1-27-9 | 2733631 | U | INSTR ECHO MSL | INSTR | 8-27-9 | |
| 1-30-9 | 2733631 | V | INSTR ECHO MSL | INSTR | 8-26-9 | |
| 2-17-9 | 2733242 | Memo | C/O PROC MSL INSTR | INSTR | 8-27-9 | |
| 2-19-9 | 2733631 | W | INSTR ECHO MSL | INSTR | 8-25-9 | |
| 2-26-9 | 2733631 | Memo | INSTR ECHO MSL | INSTR | 8-27-9 | |
| 3-12-9 | 2733242 | F | C/O PROC MSL INSTR | INSTR | 8-29-9 | |
| 3-20-9 | 2733242 | G | C/O PROC MSL INSTR | INSTR | 10-3-9 | |
| 3-31-9 | 2795459 | New | METER CALIB I & F CONSOLE | INSTR | 12-10-9 | |
| 3-31-9 | 2795459 | A | METER CALIB I & F CONSOLE | INSTR | 12-10-9 | |
| 3-31-9 | 2795459 | Memo | METER CALIB I & F CONSOLE | INSTR | 12-10-9 | |
| 4-16-9 | 2733631 | Y | INSTRUMENTATION ECHO MISSILE | INSTR | 8-22-9 | |
| 4-24-9 | 2733631 | Z | INSTRUMENTATION ECHO MISSILE | INSTR | 8-22-9 | |
| 4-28-9 | 2733631 | Memo | INSTRUMENTATION ECHO MISSILE | INSTR | 8-25-9 | |
| 4-28-9 | 2733631 | H | INSTRUMENTATION ECHO MISSILE | INSTR | 8-25-9 | |
| 4-28-9 | 2733631 | J | INSTRUMENTATION ECHO MISSILE | INSTR | 8-25-9 | |
| 4-28-9 | 2733995 | S | A.O. CANCELLATION INST SEC | INSTR | 4-30-9 | |
| 5-4-9 | 2733631 | AC | INSTRUMENTATION ECHO MISSILE | INSTR | 8-7-9 | |
| 5-4-9 | 2733631 | AD | INSTRUMENTATION ECHO MISSILE | INSTR | 8-21-9 | |
| 5-5-9 | 2796336 | New | CONNECTION IDENTIFICATION CABLE | INSTR | 8-31-9 | |
| 5-9-9 | 2733631 | AF | INSTRUMENTATION ECHO MISSILE | INSTR | 8-22-9 | |
| 5-28-9 | 2733631 | Memo | INSTRUMENTATION ECHO MISSILE | INSTR | 8-25-9 | |
| 6-23-9 | 2795459 | Memo | METER CALIBRATION I & F CONSOLE | INSTR | | * |
| 6-30-9 | 2733631 | Memo | INSTRUMENTATION ECHO MISSILE | INSTR | 8-19-9 | |
| 7-1-9 | 2733242 | J | CHECKOUT PROCEDURE MISSILE INST. | INSTR | 9-2-9 | |
| 7-1-9 | 2733631 | AJ | INSTRUMENTATION ECHO MISSILE | INSTR | 8-19-9 | |
| 7-28-9 | 2733631 | AK | INSTRUMENTATION ECHO MISSILE | INSTR | 8-26-9 | |
| 8-5-9 | 2733631 | AL | INSTRUMENTATION ECHO MISSILE | INSTR | 8-26-9 | |
| 8-8-9 | 2733631 | AM | INSTRUMENTATION ECHO MISSILE | INSTR | 8-26-9 | |
| 8-20-9 | 2733631 | AO | INSTRUMENTATION ECHO MISSILE | INSTR | 8-27-9 | |
| 8-21-9 | 2733631 | Memo | INSTRUMENTATION ECHO MISSILE | INSTR | 8-26-9 | |
| 8-21-9 | 7733595 | J | INSTR C/O PROC ECHO MSL | INSTR | 10-29-9 | # |
| 8-26-9 | 7733595 | K | INSTR C/O PROC ECHO MSL | INSTR | 10-29-9 | # |
| 8-27-9 | 7796659 | New | CALIB PROC FOR A.C. AMPL DEMOD | INSTR | 8-31-9 | # |
| 9-24-9 | 7733595 | Rwk | INSTL C/O PROC ECHO MSL | INSTR | 10-29-9 | # |
| 10-3-9 | 7733595 | Memo | INSTL C/O PROC ECHO MSL | INSTR | 10-29-9 | # |
| 10-3-9 | 2733242 | Memo | C/O PROC MSL INSTR | INSTR | 8-27-9 | |
| 10-3-9 | 2733242 | K | C/O PROC MSL INSTR | INSTR | 10-3-9 | |
| 10-8-9 | 2733631 | AP | INSTR ECHO MSL | INSTR | 10-12-9 | |
| 10-26-9 | 2796841 | New | COMMAND RECEIVER RELOCATION | INSTR | 11-10-9 | |
| 10-26-9 | 2733631 | AS | INSTR ECHO MSL | INSTR | 10-31-9 | |
| 11-7-9 | 2796841 | B | COMMAND RECEIVER RELOCATION | INSTR | 11-10-9 | |
| 11-24-9 | 7795458 | C | CALIB PROC I & F CONSOLE METER PANEL | INSTR | 12-10-9 | |
| 11-24-9 | 7795458 | Memo | CALIB PROC I & F CONSOLE METER PANEL | INSTR | 12-10-9 | |
| 1-5-0 | 2733995 | AD | AO CANC | INSTR | | * |
| 2-15-0 | 2796873 | E | INSTR INFLIGHT TRANS MOD | INSTR | 2-17-0 | |

# ACCOMPLISHED BY FIELD STATION A.O.

* NOT APPLICABLE

DOUGLAS

DRAWING NO. 7796330
PAGE NO. 5.0
CHANGE LETTER C

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 2-23-9 | 2795888 | New | FUEL INJECTOR PRESS SWITCH ADJ | PP | 9-11-9 | |
| 3-27-9 | 2796121 | New | RWK OF $GO_2$ INFLIGHT PRESS SYS | PP | 8-25-9 | |
| 4-8-9 | 2796121 | A | RWK OF $GO_2$ INFLIGHT PRESS SYS | PP | 9-16-9 | |
| 4-8-9 | 2796197 | New | RWK TURBINE EXHAUST EXT DUCT | PP | 9-15-9 | |
| 4-18-9 | 2796235 | New | SAFETY WIRING SUP EXT BOLTS | PP | 9-4-9 | |
| 4-20-9 | 2796268 | New | REMOVAL $GH_2$ MSL BOTTLES | PP | 8-17-9 | |
| 4-24-9 | 2796268 | A | REMOVAL $GH_2$ MSL BOTTLES | PP | 8-16-9 | |
| 5-8-9 | 7795712 | E | C/O PROC MSL PWR PLANT MB-3 BLK 1 ENG | PP | 10-13-9 | # |
| 5-9-9 | 7795362 | B | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 6-5-9 | 2796467 | New | REPLACE Q/D CAP ASSY | PP | 9-10-9 | |
| 6-10-9 | 2733996 | BU | AO CANC | PP | 10-12-9 | |
| 6-15-9 | 7795884 | A | 117L BLK I C/O PROC MSL AT PAD | PP | 12-22-9 | # |
| 6-17-9 | 2796532 | New | RWK LUBE OIL TANK VENT LINE | PP | 8-17-9 | |
| 6-22-9 | 7795712 | Memo | C/O PROC MSL PWR PLANT MB-3 BLK I ENG | PP | 1-13-9 | # |
| 6-24-9 | 2796580 | New | INSP OXIDIZER START TANK VENT VALVE | PP | 8-12-9 | |
| 6-26-9 | 7795884 | Memo | 117L BLK I C/O PROC MSL AT PAD | PP | 12-22-9 | # |
| 6-30-9 | 7795362 | Memo | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 7-11-9 | 2796532 | A | RWK LUBE OIL TANK VENT LINE | PP | 8-17-9 | |
| 7-24-9 | 2796645 | New | FUEL START TANK PRESS SWITCH INSP | PP | 8-12-9 | |
| 7-25-9 | 7795362 | C | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 7-25-9 | 7795362 | D | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 8-5-9 | 2796467 | Memo | REPL Q/D CAP ASSY | PP | 9-10-9 | |
| 8-5-9 | 2796121 | Memo | RWK $GO_2$ INFLIGHT PRESS SYS | PP | 8-25-9 | |
| 8-5-9 | 2796645 | Memo | FUEL START TANK PRESS SWITCH INSP | PP | 9-23-9 | |
| 8-5-9 | 7795362 | Memo | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 8-5-9 | 2795675 | New | REINFORCING RING DRAIN HOLE PLUG | PP | 9-4-9 | |
| 8-5-9 | 2796580 | Memo | INSP OXIDIZER START TANK VENT VALVE | PP | 8-12-9 | |
| 8-8-9 | 2796532 | Memo | RWK LUBE OIL TANK VENT LINE | PP | 8-17-9 | |
| 8-8-9 | 2796197 | Memo | RWK TURBINE EXHAUST EXT DUCT | PP | 9-15-9 | |
| 8-10-9 | 7795362 | Memo | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 8-10-9 | 2795888 | Memo | FUEL INJECTOR PRESS SWITCH ADJ | PP | 9-11-9 | |
| 8-10-9 | 2796268 | Memo | REMOVAL $GH_2$ MSL BOTTLE | PP | 8-17-9 | |
| 8-12-9 | 2796121 | Rwk | RWK $GO_2$ INFLIGHT PRESS SYS | PP | 8-16-9 | |
| 8-12-9 | 2796235 | Memo | SAFETY WIRING SUP EXT BOLTS | PP | 9-4-9 | |
| 8-20-9 | 7795712 | F | C/O PROC MSL PWR PLANT MB-3 BLK I ENG | PP | 10-13-9 | # |
| 8-24-9 | 7795362 | E | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 8-26-9 | 2733996 | CM | AO CANC | PP | | * |
| 9-15-9 | 2795888 | A | FUEL INJECTOR, PRESS SWITCH ADJ | PP | 9-23-9 | |
| 9-24-9 | 2796645 | Memo | FUEL START TANK PRESS SWITCH INSP | PP | 9-23-9 | |
| 10-6-9 | 2796645 | Rwk | FUEL START TANK PRESS SWITCH INSP | PP | 10-7-9 | |
| 10-9-9 | 2733996 | Memo | AO CANC | PP | 10-12-9 | |
| 10-12-9 | 2733996 | CS | AO CANC | PP | | * |
| 10-19-9 | 2796802 | New | CLEARENCE INSP | PP | 10-23-9 | |
| 10-30-9 | 2795464 | A | LUBE OF GIMBAL BEARINGS | PP | 11-24-9 | |
| 11-7-9 | 2796854 | New | MOD, 4-WAY SOLENOID VALVE | PP | 11-12-9 | |
| 11-10-9 | 7795362 | F | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 11-24-9 | 7795884 | D | 117L BLK I C/O PREC MSL AT PAD | PP | 12-22-9 | # |
| 11-27-9 | 2796802 | A | CLEARENCE INSP | PP | 12-18-9 | |
| 12-1-9 | 7795362 | Vari | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 12-1-9 | 7795884 | E | 117L BLK I C/O PREC MSL AT PAD | PP | 12-22-9 | # |
| 12-11-9 | 2796700 | C | GG LIQ OXY REG SETTING | PP | 12-11-9 | |
| 12-12-9 | 2796943 | New | REPL MAIN PNEU 4 WAY SOLENOID VALVE | PP | 12-16-9 | |
| 12-15-9 | 2796854 | A | MOD, 4 WAY SOLENOID VALVE | PP | 12-16-9 | |
| 1-7-0 | 7795362 | Vari | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |

* NOT APPLICABLE - # ACCOMPLISHED BY FIELD STATION A.O.

DRAWING NO. 7796330
PAGE NO. 5.1
CHANGE LETTER C

L-260-256 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 1-14-0 | 7795362 | G | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |
| 1-19-0 | 2796992 | New | MAIN ENG PROP VALVE INSP | PP | 1-20-0 | |
| 1-26-0 | 7733816 | Var1 | C/O PROC IM 1812-3 L/E | PP | 2-11-0 | # |
| 1-26-0 | 2796700 | E | GG LIQ OXY REG SETTING | PP | 2-17-0 | |
| 2-9-0 | 2797017 | New | C/O PROC FUEL INJECT PRESS SWITCH | PP | 2-11-0 | |
| 2-10-0 | 7795362 | H | 117L TEST PROP FLOW PROC | PP | 2-13-0 | # |

# ACCOMPLISHED BY FIELD STATION A.O.

* [illegible]

DRAWING NO. 7796330
PAGE NO. 6.0
CHANGE LETTER C

L-260-256 (1-59)

| DATE | DRAWING OR E.O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 3-19-9 | 2796058 | New | MISSILE MATING | GE | 12-15-9 | |
| 3-19-9 | 2796059 | New | MISSILE TRANSPORTING | GE | 8-6 | |
| 8-5-9 | 2796059 | A | MISSILE TRANSPORTING | GE | 8-6 | |
| 8-19-9 | 2796059 | Memo | MISSILE TRANSPORTING | GE | | * |

* NOT APPLICABLE

DRAWING NO. 7796830
PAGE NO. 7.0
CHANGE LETTER C

L-260-256 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 2-20-9 | 7795997 | A | HYD C/O MSL | HM | 9-21-9 | # |
| 3-11-9 | 2795323 | J | HYD C/O MSL | HM | 9-21-9 | # |
| 3-19-9 | 2795323 | K | HYD C/O MSL | HM | 9-21-9 | # |
| 3-20-9 | 2795323 | L | HYD C/O MSL | HM | 9-21-9 | # |
| 3-30-9 | 2795323 | M | HYD C/O MSL | HM | 9-21-9 | # |
| 3-30-9 | 2795323 | Memo | HYD C/O MSL | HM | 9-21-9 | # |
| 3-30-9 | 7795997 | B | HYD C/O MSL | HM | 10-7-9 | # |
| 3-30-9 | 7795188 | C | C/O PROC MSL HYD | HM | 12-10-9 | # |
| 5-15-9 | 2795323 | Memo | HYD C/O MSL | HM | 9-21-9 | # |
| 5-15-9 | 2795323 | Memo | HYD C/O MSL | HM | 9-21-9 | # |
| 5-15-9 | 7795188 | Memo | C/O PROC MSL HYD | HM | 12-10-9 | # |
| 5-16-9 | 7795997 | Memo | HYD C/O MSL | HM | 9-21-9 | # |
| 6-10-9 | 7795188 | D | C/O PROC MSL HYD | HM | 12-10-9 | # |
| 8-22-9 | 7795997 | C | HYD C/O MSL | HM | 9-21-9 | # |
| 9-10-9 | 7795188 | E | C/O PROC MSL HYD | HM | 12-10-9 | # |
| 9-24-9 | 7795188 | Memo | C/O PROC MSL HYD | HM | 12-10-9 | # |
| 2-16-0 | 2797031 | New | PRE-LAUNCH C/O UMBIL MAST LINK | HM | 2-17-0 | |

# ACCOMPLISHED BY FIELD STATION A.O.

DOUGLAS

DRAWING NO. 7796330
PAGE NO. 8.0
CHANGE LETTER C

L-260-286 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 2-12-9 | 2733894 | A | INSTL & ALIGN - LOCKHEED ADAPTER | STRUT | | * |
| 2-18-9 | 2733894 | B | INSTL & ALIGN - LOCKHEED ADAPTER | STRUT | | * |
| 5-5-9 | 2796361 | New | INSTL OF LOCKHEED ADAPTER RING | STRUT | 2-10-9 | |
| 5-13-9 | 2733999 | K | AO CANC | STRUT | | * |
| 6-1-9 | 2733999 | N | AO CANC | STRUT | | * |
| 6-15-9 | 2796513 | New | REMOVAL ENG WORK PLATFORM | STRUT | 12-22-9 | |
| 6-23-9 | 2733894 | Memo | INSTL & ALIGN - LOCKHEED ADAPTER | STRUT | | * |
| 6-25-9 | 7795858 | A | ALIGN CHECK LMSD ADAPTER | STRUT | | * |
| 7-1-9 | 2796513 | A | REMOVAL ENG WORK PLATFORM | STRUT | 12-22-9 | |
| 7-10-9 | 7795858 | Memo | ALIGN CHECK LMSD ADAPTER | STRUT | | * |
| 10-20-9 | 2733999 | T | AO CANC | STRUT | 10-21-9 | |
| 10-23-9 | 2796804 | New | INTER STAGE BONDING ECHO PROJ | STRUT | 2-10-9 | |
| 10-26-9 | 2796826 | New | HWK STRUCT ASSY GUID SECT | STRUT | 10-2-9 | |
| 11-2-9 | 2796826 | A | HWK STRUCT ASSY GUID SECT | STRUT | 11-3-9 | |
| 11-10-9 | 2733999 | Memo | AO CANC | STRUT | | * |

* NOT APPLICABLE

DRAWING NO. 7796330
PAGE NO. 9.0
CHANGE LETTER C

L-260-256 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 3-12-9 | 2733847 | New | MSL WEIGHING & C.G. DETERMINATION | WTS | 10-14-9 | |
| 11-12-9 | 2733847 | Memo | MSL WEIGHING & C.G. DETERMINATION | WTS | 10-14-9 | |

DOUGLAS

DRAWING NO. 7796330
PAGE NO. 10.0
CHANGE LETTER C

L-260-256 (1-59)

| DATE | DRAWING OR E. O. NUMBER | CHG LTR | TITLE | GROUP | COMP DATE | |
|---|---|---|---|---|---|---|
| 5-15-9 | 2795503 | G | PREFLIGHT AUTHORIZATION | OPER | | * |
| 7-21-9 | 7795500 | G | 117L PREFLIGHT & TEST PROC | OPER | 2-19-0 | # |
| 7-21-9 | 7795500 | H | 117L PREFLIGHT & TEST PROC | OPER | 2-19-0 | # |
| 8-31-9 | 7795500 | J | 117L PREFLIGHT & TEST PROC | OPER | 2-19-0 | # |
| 12-8-9 | 7795500 | K | 117L PREFLIGHT & TEST PROC | OPER | 2-19-0 | # |
| 1-19-0 | 7795500 | L | 117L PREFLIGHT & TEST PROC | OPER | 2-19-0 | # |
| 2-12-0 | 7795500 | M | 117L PREFLIGHT & TEST PROC | OPER | 2-19-0 | # |

# ACCOMPLISHED BY FIELD STATION A.O.

* NOT APPLICABLE

(FORM I-40-6)

| DATE | AO NUMBER | CHG LTR | SVC CHG | ED | PAGE | TITLE | GR | COMP DATE |
|---|---|---|---|---|---|---|---|---|
| 7-30-9 | 5791978 | B | 784 | 2 | 1 | VENT RELIEF VALVE INSTL RIM | PP | 8-8-9 |
| 7-30-9 | 3832350 | B | | 1 | 1 | SWITCH INSTL FUEL INJECTOR | GSE | 9-11-9 |
| 7-30-9 | 2842318 | New | | 1 | 1 | RWK V/ENG | PP | 9-9-9 |
| 7-30-9 | 2842424 | New | | 1 | 1 | RWK ROCKET ENG | PP | 11-13-9 |
| 7-30-9 | 2839881 | New | | 2 | 1 | RWK ROCKET ENG | PP | 9-16-9 |
| 7-30-9 | 3696695 | F | | 1 | 1 | GSE 1st STAGE MOD ECHO MSL | STRUC | 9-2-9 |
| 7-30-9 | 5689806 | T | 793 | 1 | 1 | UMBIL INSTL | GE | 9-2-9 |
| 7-30-9 | 5681970 | AO | 752 | 1 | 1 | DOOR ASSY & INSTL EQUIP ACCESS | GE | 9-22-9 |
| 7-30-9 | 5602332 | AP | 752 | 1 | 1 | GUID SECT STRUCT ASSY | STRUC | 9-10-9 |
| 7-30-9 | 2842168 | New | | 2 | 1 | RWK ROCKET ENG | PP | 9-16-9 |
| 7-30-9 | 5832403 | New | | 2 | 1 | MOD GUID SECT CONT | STRUC | 9-23-9 |
| 7-30-9 | 5681975 | R | 775 | 2 | 1 | UMBIL INSTL GROUND NOSE CONE | GSE | 9-2-9 |
| 8-7-9 | 2838709 | New | | 8 | 1 | RWK ROCKET ENG | PP | 11-24-9 |
| 8-13-9 | 2839853 | New | | 3 | 1 | RWK ROCKET ENG | PP | 11-7-9 |
| 8-28-9 | 2842319 | New | | 1 | 1 | RWK ROCKET ENG | PP | 10-10-9 |
| 9-28-9 | 2848058 | New | | 1 | 1 | RWK FUEL START TANK | PP | 10-7-9 |
| 10-19-9 | 5725028 | AM | 852 | 1 | 1 | EQUIP INSTL ENG SECT | GSE | 10-19-9 |
| 12-2-9 | 2842320 | New | | 1 | 1 | ROCKET ENG RWK | PP | 12-4-9 |
| 12-10-9 | 5832403 | New | | 3 | 1 | MOD GUID SECT CONT | GSE | 12-11-9 |
| 12-13-9 | 3697073 | C | | 1 | 1 | REMOVAL GUID CTR SECT COMP | GSE | 2-13-0 |
| 12-22-9 | 2848537 | | | 1 | 1 | ROCKET ENG SECT CONT | GSE | 12-22-9 |
| 1-6-0 | 3697055 | | | 1 | 1 | PANEL ISOLATION | GSE | 2-13-0 |
| 2-16-0 | 3848395 | | | 1 | 1 | MOD KIT PRESS SWITCH | GSE | 2-16-0 |

DOUGLAS

DRAWING NO 7796339
PAGE NO. 11.0
CHANGE LETTER C

25-1388 (5-56)

The following A.O.'s have been cancelled and the work accomplished by VAFB E.O.'s as noted:

| A.O. NUMBER | CHG LTR | SVC CHG | CANC BY EO | CHG LTR | ACCOM BY EO | CHG LTR |
|---|---|---|---|---|---|---|
| 2725028 | AM | | 2733993 | AB | 2796342 | New |
| 3697073 | C | | 2733993 | AK | 2796625 | C,D |
| 5844175 | A | | 2733993 | AA | 2795734 | H |
| 5696837 | K | | 2733995 | S | 2733631 | |
| WRO DM18-2262 | | | 2733996 | CM | 2795888 | New & A |
| 2848211 | New | | 2733996 | CS | 2796467 | New |

| DOUGLAS AIRCRAFT CO., INC. MISSILES<br>ENGINEERING ORDER SANTA MONICA DIVISION<br>FORM 40-315 (3-58) | SHEET 1 OF 1<br>DATE OF ISSUE MAR 1 1960<br>DATE OF ISSUE | E.O. 7796330<br>DRAWING CHANGED ON CHANGE LETTER D<br>RESERVED CHANGE LETTER |
|---|---|---|

DESCRIBE IN DETAIL AND GIVE REASON:

ISSUED FOR USE AT VAFB ONLY

1. AFFECTED PAGES: 1.0, 1.1, 2.0, 3.1

2. CHANGED PAGES: 1.0, 1.1, 2.0,

3. PAGE 3.1 REVISED & RETYPED

REASON: TO PROVIDE ADDITIONAL E.O. LISTINGS AND COMPLETION DATES & TO ESTABLISH A.O. LISTING SHEETS.

TITLE: PREP OF MISSILE 223

DISPOSITION

| MODEL | REL. S.O. | EFFECTIVITY |
|---|---|---|
| DM1212-3 | 168319 | RECORD |

RELEASE THE FOLLOWING FOR EFFECTIVITY LISTED ABOVE

| DRAWING NUMBER | REQUIREMENTS PER ARTICLE | FORMER REQ. PER ARTICLE | NEXT ASSEMBLY |
|---|---|---|---|
| | | | |

NO ACTION

| | |
|---|---|
| DESIGN GROUP: PREP | E.O. PREPARED BY: MELATTI 2-26-0 |
| | DWG. MADE OR CHANGED BY: MELATTI 2-26-0 |
| ENGINEERING SECT.: — | DESIGN APPROVAL |
| | PROJECT ENGINEER |
| TIME CHARGE S.O.: 168319 | CUSTOMER |
| | WEIGHTS W. / W. |
| SERIAL OR EWO: 71634 | CHECK REQ APPROVAL |
| WRO: — | DRAWING CHECKED BY |
| | STRENGTH 2-25-6 |
| PATTERN / DIE / MOLD / AFFECTED — YES / NO | MATERIAL 3-1-60 |
| | RELEASE |
| EXPERIMENTAL | |
| PRODUCTION | |
| TOOLS | |

EXTRA PRINTS OF DWG TO _____ EXTRA PRINTS OF E.O. TO

Prepared By D. Perdew
Date 2-23-60

[redacted]

DER 223

Missile No. 223
Item No. 11.15
Page No. 11

TIMES OF VARIOUS EVENTS

(Data taken from 35mm film photographed at 2550 ft., 110 degrees, and 48 fps)

| Event | *Time of Day | * L/O + |
|---|---|---|
| Lift-off | 1215:14.238 | |
| Vernier engine starts roll (to left) | 1215:16.26 | 2.02 |
| Vernier (max deflection) | 1215:16.30 | 2.06 |
| Vernier (centers) | 1215:16.51 | 2.27 |
| Main engine gimbal starts | 20.83 | 6.59 |
| Main engine hard over (left) | 21.20 | 6.96 |
| Main engine center | 21.75 | 7.51 |
| Main engine hard over (right) | 22.58 | 8.34 |
| Main engine center | 23.00 | 8.76 |
| Main engine hard over (left) | 23.32 | 9.08 |
| Main engine center | 24.30 | 10.06 |
| Main engine hard over (right) | Not readable(angle) | |
| Vernier engine hard over (right) | 24.68 | 10.44 |
| Roll program start | 23.85 | 9.61 |
| Roll approximately 15° to right | 25.35 | 11.11 |
| Main engine center | 25.86 | 11.62 |
| Main engine hard over (left) | 26.45 | 12.21 |
| Main engine Center | 27.24 | 13.00 |
| Rolls to left | 27.24 | 13.00 |
| Main engine hard over (right) | 27.62 | 13.38 |
| Vernier center (following main engine) | 28.65 | 14.41 |
| Main engine and Vernier engine hard left | 29.23 | 14.99 |
| Main engine and Vernier engine center | 30.16 | 15.92 |
| Gimbaling continued through entire flight | | |

* Corrections have been made for a 14 frame lag on time due to position of strobe (0.26 seconds).

[redacted]

DOUGLAS

COPY NO. 66

Prepared by R. Rice & R. Perdew [redacted] Missile No. 223
Date 2-23-60 [redacted] Item No. 11.16
Page No. 12

## TIMES OF VARIOUS EVENTS

(Data taken from 70mm film photographed at 2,550 ft., 110 degrees, and 10 fps.)

| Event | * Time L/O + |
|---|---|
| Vapor appears approximately 2' above first stage | T + 0.4 |
| Vapor disappears (remains relative to shroud) | T + 2.9 |
| Object (one foot diameter or smaller) is approximately 3 feet from missile and 18 feet below top of first stage) | T + 9.7 |
| Vapor** appears (initially) from 2nd stage (LMSD Vehicle) | T + 9.7 |
| Vapor intensity increases (approximately 1 foot above first stage) | T + 9.8 |
| Vapor intensity increases (approximately 1 foot above first stage) | T + 9.9 |
| Vapor intensity increases (approximately 1 foot above first stage) | T + 10.0 |
| Vapor intensity increases (approximately 1 foot above first stage) | T + 10.1 |
| Vapor intensity ipcreases (approximately 1 foot above first stage) | T + 10.2 |
| Vapor trail disappears from view (hidden by missile pitch) | T + 11.2 |
| Vapor trail appears again (missile pitches back) | T + 12.5 |
| Vapor trail increases in intensity | T + 13.0 |
| Vapor trail extends well beyond missile (down stream) | T + 13.1 |
| Vapor trail disappears (missile pitch) | T + 13.7 |
| White streak on second stage appears (approximately 2' in length). Appears to be liquid. | T + 13.6 |
| White streak extends down complete length of first stage | T + 13.9 |
| White streak disappears (after intensifying and receeding) | T + 14.8 |
| Vapor appears (as at T + 9.7) | T + 15.3 |
| White streak (liquid) appears on second stage | T + 16.3 |
| White streak extends along first stage | T + 16.4 |
| White streak extends to seam above LOX tank area and reappears out of LOX tank section-boattail section seam. | T + 17.0 |
| End of film | T + 18.2 |

* Times were obtained by counting frames and are approximate.
** Color of vapor cannot be determined.

[redacted]

DOUGLAS

JOINT MESSAGEFORM

SECURITY CLASSIFICATION [redacted]

SPACE BELOW RESERVED FOR COMMUNICATION CENTER

1

| PRECEDENCE | TYPE MSG (Check) | | | ACCOUNTING SYMBOL | ORIG. OR REFERS TO | CLASSIFICATION OF REFERENCE |
|---|---|---|---|---|---|---|
| ACTION PRIORITY | BOOK | MULTI | SINGLE | | | |
| INFO | | | XX | | NA | NA |

FROM: AIR FORCE BALLISTIC MISSILE DIVISION FIELD OFFICE
VANDENBERG AFB, CALIFORNIA

TO: COMMANDER, AIR FORCE BALLISTIC MISSILE DIVISION, INGLEWOOD, CALIFORNIA

INFO: DAC FIELD OFFICE, VAFB, LMSD FIELD OFFICE, VAFB, 1ST MD, VAFB

~~SECRET~~ FROM WDGEV NSB-10 . SUBJ: FLASH REPT OF FIRST DISCOVERER SATELLITE LAUNCH FROM VANDENBERG AFB.

1. VEHICLE CONFIGURATION

1.1 DISCOVERER SATELLITE VEHICLE, XA MODEL 3205 SERIAL 1022

1.2 BOOSTER, MODIFIED IOC THOR SERIAL 163

2. DATE AND TIME OF LAUNCH: FEB 28, 1959, 13:49:16 PST.

3. TEST OBJECTIVES

3.1 PRIMARY OBJECTIVES

3.1.1 DEMONSTRATE THE ORBITAL CAPABILITY OF THE THOR BOOSTED DISCOVERER CONFIGURATION.

3.1.2 ACHIEVE REQUIRED THOR SYSTEM PERFORMANCE TO LAUNCH, CONTROL, SEPARATE AND PLACE DISCOVERER AT THE SEPARATION POINT WITHIN ± 4 DEGREES OF DESIRED FLIGHT PATH ANGLE.

3.1.3 GROUND SUPPORT EQUIPMENT MUST PROVIDE ADEQUATE

SPECIAL INSTRUCTIONS

DOWNGRADED AT 3 YEAR INTERVALS
DECLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

By Authority of 205-2
[signature] 4 APR 1960

[redacted] CHANGED TO

| DATE | TIME |
|---|---|
| 28 | 1830 |
| MONTH | YEAR |
| 2 | 59 |

SYMBOL: AFBMD Field Office WDGEVR

TYPED NAME AND TITLE (Signature, if required): PATRICK B. MULCAIRE, Major, USAF

PHONE: 8-5133 | PAGE NO. 1 | NO. OF PAGES

SECURITY CLASSIFICATION [redacted]

RELEASER

SIGNATURE

TYPED (or stamped) NAME AND TITLE

DOWNGRADED AT 3 YEAR INTERVALS,
DECLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

FORM 178 REPLACES DD FORM 178, 1 OCT 49, WHICH WILL BE USED UNTIL EXHAUSTED

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM: AIR FORCE BALLISTIC MISSILE DIVISION FIELD OFFICE
VANDENBERG AFB, CALIFORNIA

GROUND SUPPORT AND CHECKOUT REQUIRED BY THE DISCOVERER SYSTEM UP TO AND INCLUDING FIRING FROM THE LAUNCH PAD.

3.1.4 DISCOVERER

3.1.4.1 AIRFRAME. DEMONSTRATE AIRFRAME COMPATIBILITY TO BOOSTER VEHICLE, AND MEET ENVIRONMENTAL AND OPERATING REQUIREMENTS.

3.1.4.2 PROPULSION SYSTEM. DEMONSTRATE REQUIRED PERFORMANCE OF ULLAGE ROCKETS, LR-81-3 ENGINE AND PROPELLANT UTILIZATION TO PLACE DISCOVERER VEHICLE IN ORBIT.

3.1.4.3 AUXILIARY POWER SYSTEM. DEMONSTRATE UTILITY OF BATTERIES AND INVERTERS AND FUNCTIONAL ADEQUACY OF THERMAL DESIGN CRITERIA.

3.1.4.4 GUIDANCE AND CONTROL. DEMONSTRATE ABILITY TO PERFORM PROPER SEPARATION, TIMER ACTUATION, THE INITIATION OF ENGINE SEQUENCE, AND VEHICLE ORIENTATION DURING ALL PHASES FOLLOWING SEPARATION. ORIENTATION PERFORMANCE INCLUDES SS/D COMPUTER, IRP, HORIZON EX SCANNER, PNEUMATIC AND HYDRAULIC CONTROL SYSTEMS.

3.1.4.5 SUBSYSTEM H-TRACKING, TELEMETRY AND VEHICLE COMMAND. SS/H EQUIPMENTS MUST PROVIDE FOR GROUND RECORDS OF PRIMARY VEHICLE INSTRUMENTATION PARAMETERS, ALL GROUND-SPACE COMMANDS, AND THE TAKING AND PROCESSING OF DATA NECESSARY FOR DETERMINATION OF EPHEMERIS, ACQUISITION INFORMATION, AND VEHICLE TIMER RESET INFORMATION.

3.2 SECONDARY TEST OBJECTIVES

3.2.1 SAMPLE AND EVALUATE THE THERMAL ENVIRONMENT.

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DECLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

| SYMBOL | PAGE NR | NR OF PAGES | SECURITY CLASSIFICATION | INITIALS |
|---|---|---|---|---|
| WDGEVR | 2 | | [redacted] | rsb |

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM: AFBMD FIELD OFFICE
VANDENBERG AFB, CALIF

3.2.2 TO OBTAIN AND MAINTAIN A LOCAL VERTICAL, AFTER ORIENTATION, WITH REQUIRED ACCURACY.

3.2.3 EVALUATE FUNCTIONAL PERFORMANCE OF COMMUNICATIONS SYSTEM.

3.2.4 ACQUISITION DURING ORBITAL PHASE BY ALTERNATE METHODS.

3.2.5 EVALUATION OF VEHICLE COMBINATION PERFORMANCE THROUGH OPTICAL METHODS.

3.3 TERTIARY TEST OBJECTIVE

3.3.1 EVALUATE RECOVERER OPERATION BY SIMULATION.

3.3.2 EVALUATE PERSONNEL AND GROUND EQUIPMENT DESIGN FROM HUMAN ENGINEERING APPROACH.

4. DESCRIPTION OF ACCOMPLISHMENT OF TEST OBJECTIVE

4.1 PRIMARY OBJECTIVE 3.1.1 WAS MET INSOFAR AS IN THE INJECTION PHASE INSTRUMENTATION AND TRACKING DATA WAS ABLE TO DETERMINE AT THIS TIME. TRACKING INFORMATION WAS RECEIVED AT VAFB UNTIL 536 SECONDS AFTER LIFTOFF FROM THE TELEMETRY TRANSMITTER. VAFB AND MUCU RADAR MAINTAINED RADAR TRACK UNTIL 506 SECONDS AND 521 SECONDS RESPECTIVELY. A CONFIRMING FIRST ORBITAL PASS ACQUISITION HAS NOT YET BEEN RECEIVED.

4.2 PRIMARY OBJECTIVE 3.1.2 WAS ACHIEVED IN THAT THE SYSTEM DEMONSTRATED THE CAPABILITY OF THE THOR TO PLACE THE DISCOVERER AT THE SEPARATION POINT WITH DESIRED THOR BURNOUT VELOCITY ATTAINED BY A THOR BURNING TIME OF 2 MINUTES 40.75 SECONDS. THOR VERNIER ENGINES SHUT DOWN 9.05 SECONDS LATER. THE FLIGHT PATH PITCH ANGLE AT SEPARATION WAS APPARENTLY NORMAL AS SUBSTANTIATED BY

DOWN-GRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER 12 YEARS DOD DIRECTIVE 5200.10

| SYMBOL | PAGE NR | NR OF PAGES | SECURITY CLASSIFICATION | INITIALS |
|---|---|---|---|---|
| WDGEVR | 3 | | [redacted] | rab |

DD FORM 1 MAY 55 173-1

U. S. GOVERNMENT PRINTING OFFICE: 1956-

TRACK TO AN INJECTION ALTITUDE AS REPORTED X BY PALO ALTO COMPUTER OF 165 NAUTICAL MILES AND INJECTION VELOCITY OF 25,670 FT/SEC. THOR LIFT OFF WAS ATTAINED AT 13:49 AND 16 SECONDS AFTER AN ABREVIATED COUNTDOWN WHICH STARTED AT 0800. THE THOR AUTOPILOT PERFORMED ITS PROGRAMMED ROLL STARTING AT 2 SECS AND ENDING AT 9 SEC TO THE LAUNCH AZIMUTH OF 183° AS VERIFIED BY TRACKING DATA. THE PITCH PROGRAM WAS SMOOTH AND IN ACCORDANCE WITH SPECIFIED TIMES. SEPARATION OCCURRED AT 175 SECONDS, DEMONSTRATING SUCCESSFUL OPERATION OF SEPARATION SEQUENCE.

4.3 PRIMARY OBJECTIVE 3.1.3 WAS NET IN THAT THE GROUND SUPPORT EQUIPMENT PERFORMED WITHIN DESIGN SPECIFICATIONS WITH THE EXCEPTION OF THE PROPELLANT SENSING CIRCUITRY WHICH NECESSITATED A DELAY IN THE COUNTDOWN OF APPROXIMATELY THIRTY MINUTES. PROTECTIVE MODIFICATIONS TO THE LAUNCH EQUIPMENT TO REDUCE FLAME AND BLAST DAMAGE RESULTED IN LESS THAN EXPECTED DAMAGE.

4.4 PRIMARY OBJECTIVE 3.1.4.1 ~~WAS~~ WAS APPARENTLY COMPLETELY ACHIEVED AS DEMONSTRATED BY DISCOVERER AIRFRAME STRUCTURAL INTEGRITY THRU LAUNCH SEPARATION, SECOND STAGE IGNITION AND SECOND STAGE BURNOUT.

4.5 PRIMARY OBJECTIVE 3.1.4.2 WAS COMPLETELY ACHIEVED AS RECORDED BY TELEMETRY THRU THE SEPARATION SEQUENCE, ENGINE IGNITION AND ENGINE BURNOUT. SEPARATION OCCURRED AT 175 SECONDS AND ENGINE IGNITION OCCURRED AT 340 SECONDS WITH A RECORDED BURNING TIME OF 96 SECONDS. THIS DEMONSTRATED SUCCESSFUL OPERATION OF THE X ULLAGE ROCKETS, IGNITION OF THE LR-81-3 ENGINE IN A SPACE ENVIORNMENT

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

JOI[illegible]SAGEFORM-CONTI[illegible]ATION SHEET

SECURITY CLASSIFICATION [redacted]

[illegible] FIELD OFFICE
[illegible] AFB, CALIF.

[illegible] HIGHLY EFFICIENT PROPELLANT UTILIZATION DURING 96 SECOND BURNING TIME AGAINST NOMINAL BURNING TIME OF 97 SECONDS.

4.6 PRIMARY OBJECTIVE 3.1.4.3 WAS FULFILLED INSOFAR AS DEMONSTRATED BY PERFECT RECEPTION OF ALL TRACKING AIDS FOR 100 SECONDS AFTER SECOND STAGE ENGINE BURNOUT. THE ADEQUACY OF THE THERMAL DESIGN CRITERIA IS UNKNOWN AT THIS TIME.

4.7 PRIMARY OBJECTIVE 3.1.4.4 WAS COMPLETELY ACHIEVED IN THE SEPARATION SEQUENCE, AND "D" TIMER ACTUATION THRU THE ENGINE SEQUENCE. VEHICLE ORIENTATION, SS/D COMPUTER, IRP, HORIZON SCANNER, AND PNEUMATIC/HYDRAULIC CONTROLS SYSTEMS HAVE GIVEN NO DEFINITE INDICATION OF ANY MALFUNCTION. DETAILED INFORMATION WILL BE FURNISHED UPON COMPLETION OF TELEMETRY DATA REDUCTION.

4.8 PRIMARY OBJECTIVE # 3.1.4.5 WAS ACHIEVED THRU TRACKING BY VAFB TLM-18 FOR 536 SECONDS, VAFB TRI-HELIX FOR 516 SECONDS. MUGU RADAR TRACKED FOR 521 SECONDS. LOSS OF TRACK AT VAFB AND MUGU RADARS WERE ~~[illegible]~~ 183° 182.5° AZIMUTHS RESPECTIVELY AND MUGU RADAR RANGE WAS IN EXCESS OF TWO MILLION YARDS. ENGINE IGNITION TIMER DELAY COMMAND WAS INITIATED AT 280 SECONDS FOR A PERIOD OF 32.4 SECONDS. ENGINE IGNITION AS INDICATED BY SECOND STAGE CHAMBER PRESSURE OCCURRED AT 340 SECONDS. THE TAKING AND PROCESSING OF DATA FOR EPHEMERIS, ACQUISITION AND TIMER RESET WAS COMPLETELY SATISFACTORY EXCEPT FOR DATA TO BE FURNISHED BY THE TELEMETRY SHIP THE DETAILS OF WHICH ARE UNKNOWN AT THIS TIME. VEHICLE TRANSMISSIONS NECESSARY FOR FIRST PASS TRACKING WERE NOT RECEIVED.

DOWNGRADED AT 3 YEAR INTERVALS;
DECLASSIFIED AFTER 12 YEARS.
DOD DIRECTIVE 5200.10

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM: AFBMD FIELD OFFICE
VANDENBERG AFB, CALIF

5. SECONDARY OBJECTIVE

5.1 SECONDARY OBJECTIVE 3.2.1 AND 3.2.2 ARE IMPOSSIBLE TO EVAULATE FROM INFORMATION AVAILABLE AT THIS TIME.

5.2 SECONDARY OBJECTIVE 3.2.3 WAS NORMAL AND SATISFACTORY.

5.3 SECONDARY OBJECTIVE 3.2.4 WAS NOT ACCOMPLISHED

5.4 SECONDARY OBJECTIVE 3.2.5 WAS REPORTED TO BE ONE HUNDRED PERCENT ACCOMPLISHED BY COMPLETE COVERAGE OF ALL CAMERAS. THE FILM RESULTS WILL BE PROVIDED WHEN AVAILABLE.

6. TERTIARY OBJECTIVES

6.1 OBJECTIVE 3.3.1 CANNOT BE EVALUATED AT THIS STATION.

6.2 OBJECTIVE 3.3.2 WAS COMPLETELY AND EXCELLENTY ACCOMPLISHED IN THE SUPERB PERFORMANCE OF THE LAUNCH CREW, THE CONTROL CENTERS AND ALL TRACKING STATION PERSONNEL, FROM A PERSONNEL PERFORMANCE STANDPOINT. HUMAN ENGINEERING DESIGN RECOMMENDATION REGARDING EQUIPMENT WILL BE MADE SEPARATELY.

7. CONCLUSION

ALTHOUGH INJECTION INTO ORBIT HAS NOT YET BEEN CONFIRMED, RESULTS AVAILABLE DEMONSTRATE A HIGH DEGREE OF SUCCESS WAS ACHIEVED IN THE LAUNCH OF DISCOVERER 1.

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U. S. GOVERNMENT PRINTING OFFICE: 1955-458284

JOINT MESSAGEFORM

SECURITY CLASSIFICATION

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| INFO | | | X | X | X | |

FROM:
CHIEF AFBMD FLD OFC VANDENBERG AFB, CALIF

TO:
COMDR AFBMD/HEDARDC/LOS ANGELES 45, CALIF
LOCKHEED MISSILES AND SPACE DIV PALO ALTO, CALIF
AFBMD FLD OFC PALO ALTO CALIF
DOUGLAS ACFT COMPANY SANTA MONICA, CALIF

SECRET/FROM WDGEV-4-18-C. LOSA FOR WDZW. LOCKHEED FOR DEPT 61-44 & 61-70.

SUBJECT CLN FOLLOW ON REPORT TO FLASH REPORT WDGEV-4-11-C, LAUNCH OF DISCOVERER NUMBER 2.

THIS MESSAGE IN TWO PARTS.

PART I.

PART I CONTAINS AN EVALUATION OF PAD DAMAGES THAT RESULTED FROM THE SUCCESSFUL LAUNCH OF DISCOVERER 2 ON (1018) 13 APRIL 1959 FROM PAD 4 OF COMPLEX 75-3 PLUS A HISTORY OF THE COUNTDOWN.

THE TERMINAL COUNTDOWN WAS INITIATED AT 1302 CLN 30 HOURS. NO UNSCHEDULED HOLDS OCCURRED AND LIFTOFF WAS AT 1318 CLN 42. TOTAL TERMINAL COUNTDOWN TIME WAS 16 MINUTES 12 SECONDS. MAIN ENGINE CUT-OFF OCCURRED AT 1321 CLN 20 AFTER 158.4 SECONDS OF MAINSTAGE.

SPECIAL INSTRUCTIONS

CLAS[redacted]NGED TO DOWNGRADED AT 3 YEAR INTERVALS
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By Authority of 205-2
By [illegible] 4 APR 1966

| DATE | TIME |
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| 15 MONTH | 1603Z |
| APRIL | 1959 |

WRITER

SYMBOL
WDGEV AFBMD Project Office

TYPED NAME AND TITLE (Signature, if required)
Patrick M. Malcolm, Major, USAF

PHONE 8-3122 | PAGE NR. 1 | TOTAL OF PAGES 5

SECURITY CLASSIFICATION [redacted]

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TYPED (or stamped) NAME AND TITLE

DD FORM 1 MAY 55 173 REPLACES DD FORM 173, 1 OCT 49, WHICH WILL BE USED UNTIL EXHAUSTED

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM: CHIEF, AFBMD FLD OFC, VANDENBERG AFB, CALIFORNIA [redacted]

VERNIER ENGINE CUTOFF OCCURRED 9.2 SECONDS LATER. DOUGLAS DATA ANALYSIS INDICATES SEPARATION AT 170 SECONDS. LMSD DATA SHOWS 172 SECONDS. RETRO ROCKET IGNITION WAS AT 171 SECONDS. THIS ITEM IS TO BE RESOLVED FOR THE LAUNCH REPORT.

ALL ITEMS OF GROUND EQUIPMENT FUNCTIONED PROPERLY. THE SIX LAUNCH LEGS RETRACTED ON SCHEDULES AS DID THE FUEL AND LIQUID OXYGEN MASTS AND THE UMBILICAL MAST. THE LAUNCH MOUNT AND TRANSPORTER/ERECTOR APPARENTLY SUFFERED NO STRUCTURAL DAMAGE AND COULD BE USED FOR ANOTHER LAUNCHING AFTER REPLACEMENT OF DAMAGED HOSES, CABLES AND AIR CONDITIONING DUCTS.

A GROUND FIRE DAMAGED ABOUT 50 PERCENT OF THE UMBILICALS SHOWN A SECONDARY FIRE IN THE RP-1 COMPLEX DAMAGED SOME ADDITIONAL CABLES.

THE DEFLECTOR CONE OF THE LAUNCH MOUNT SHOWS THE USUAL SURFACE FLOW, BUT SUFFERED NO SIGNIFICANT DAMAGE AND COULD BE REUSED WITHOUT REPAIR. THE REDESIGNED DEFLECTOR EXTENSIONS PROVIDED GOOD BLAST PROTECTION TO THE PROPELLANT LINES AND TRUNNIONS AND STOOD UP VERY WELL.

THE MISSILE SHELTER IS UNDAMAGED AND, ACCORDING TO THE BLAST GAGE, RECEIVED ONLY A MINIMUM OF BLAST PRESSURE.

THE FREE STANDING WALL OF THE SHELTER HAD BEEN REMOVED FROM THE PAD PRIOR TO THE LAUNCHING.

THE POWER PACK TRAILER WAS LOCATED IN A PROTECTED AREA AND SUFFERED NO DAMAGE.

COUNTDOWN HISTORY

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PRETERMINAL COUNTDOWN WAS PRECEDED BY A SERIES [illegible] BEGAN

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FROM: [redacted]

CHIEF, AFSWC FLD OFC VANDENBERG AFB, CALIFORNIA

| | |
|---|---|
| 13 GLN 02.30 BED/LC | "HART" |
| 13 GLN 02.35 TKR | PHASE I START NORMAL |
| 13 GLN 03.08 TKR | PHASE II START |
| 13 GLN 03.12 TKR | PHASE III START |
| 13 GLN 04.42 TKR | PHASE III COMPLETE |
| 13 GLN 04.42 TKR | PHASE IV START |
| 13 GLN 13 TKR | PHASE IV COMPLETE |
| 13 GLN 13.30 TKR | TECH HOLD IMPOSED |
| 13 GLN 16.05 TKR | TECH HOLD RELEASED |
| 13 GLN 16.06 BED/LC | PHASE V |
| 13 GLN 18.42 | LIFT OFF |
| 13 GLN 23 | CSO TO PAD |
| 13 GLN 38 | POST LAUNCH EVALUATION TEAM TO PAD |

PART 2

ORBITAL STAGE ADDITIONAL INFORMATION AVAILABLE AT THIS TIME IS AS FOLLOWS GLN.

/A/ AZIMUTH AT ORBITAL STAGE BURNOUT 183.5 DEGREES FROM MUCU RADAR PLOT.

/B/ POSITION AT OSV BURNOUT FROM MUCU RADAR PLOT. R WAS 663 NM H WAS 144 NM.

H WAS 144 NM.

/C/ ORBIT INCLINATION90.90 DEGREES FROM MUCU TRACKING DATA.

/D/ INJECTION ANGEL PLUS .04 DEGREES UNCORRECTED FOR REFRACTION

/E/ INJECTION VELOCITY, AVERAGE OF MUCU AND VAFB PLOTS, 25,541 FT/SEC.

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SECURITY CLASSIFICATION [redacted]

FROM: [redacted]

CHIEF, AFSWC FLD OFC VANDENBERG AFB, CALIFORNIA

AT T-440.

TASK 1 /PRE-COUNTDOWN OPERATIONS AND COUNTDOWN INITIATION WAS COMPLETED AT T-430.

TASK 2 /RBC MATING/ WAS COMPLETED AT T-351.

TASK 3 /SHELTER REMOVAL AND VEHICLE ERECTION/ WAS COMPLETED AT T-330.

TASK 4 /LANYARD CONNECTION AND FUEL TRUCK REPLACEMENT/ WAS COMPLETED AT T-223.

TASK 5/ DESTRUCT TESTS/ WERE COMPLETED AT T-222.

TASK 6 /SPATIAL STAGE ARM/ WAS COMPLETED AT T-174.

TASK 7 /CORRECT FIRST STAGE DESTRUCT SYSTEM/ WAS COMPLETED AT T-183.

TASK 8 /PROPELLANT LINE FILL/ WAS COMPLETED AT T-160.

TASK 9 /COUNTDOWN EVALUATION/ WAS COMPLETED AT T-160.

TASK 10 /PROPELLANT TANKING/ WAS COMPLETED AT T-132.

20 MIN HOLD CALLED TO CHECK SUSPECTED ACID LEAK LINES FOUND O.K.

TASK 11 /ELECTRONICS WARM-UP/ WAS COMPLETED AT 11 GLN 05.

TASK 12 /REMOVE PROPELLANT TRUCKS/ WAS COMPLETED AT T-103.

TASK 13 /GUIDANCE & FLIGHT CONTROL CHECKOUT/ WAS COMPLETED AT 11 GLN 25.

TASK 14 /FR CHECKOUT/ WAS COMPLETED AT 11 GLN 42.

TASK 15 /PRESSURIZATION/ WAS COMPLETED AT 11 GLN 33.

TASK 16 /COUNTDOWN EVALUATION/ WAS COMPLETED AT 12 GLN 49.

TASK 17 /TERMINAL COUNTDOWN/ BEGAN AT 1302 GLN 50. AFTER A 60 MIN HOLD FOR WEATHER AT T-20.

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TERMINAL COUNTDOWN SEQUENCE SHOWN

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JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION

[redacted]

FROM:

CHIEF, AFBMD FLD OFC VANDENBERG AFB, CALIFORNIA [redacted]

ALL OTHER INFORMATION PREVIOUSLY TRANSMITTED IN FLASH REPORT REMAINS VALID. ENDOF FOLLOW-ON REPORT.

BT /

/SECRET/

16/0328Z APR

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| ACTION | [redacted] | | | | | | |
| INFO | [redacted] | | | | | | |

FROM: [redacted], AFSWP FIELD OFFICE, VANDENBERG AFB, CALIF

TO: [redacted] AFSWP/SANDIEGO/LOS ANGELES 45, CALIF

LOCKHEED MISSILES AND SPACE DIVISION, PALO ALTO, CALIF

AFSWP FIELD OFFICE, PALO ALTO, CALIF

DOUGLAS AIRCRAFT COMPANY, SANTA MONICA, CALIF

INFO: 1ST MISSILE DIVISION, VANDENBERG AFB, CALIF (OSBORN)

[redacted]/FROM VERNE 6-10-C, LOS ANGELES FOR VERN. LOCKHEED FOR DEPARTMENT 62-44 AND 62-70. SUBJECT: FLASH REPORT OF LAUNCHING OF MINUTEMAN NO. 3 FROM VANDENBERG AFB.

1. VEHICLE CONFIGURATION

1.1. [redacted] VEHICLE, LOCKHEED, XA MODEL [redacted], SERIAL [redacted], SEPARATION WEIGHT, 8129 POUNDS, CONTAINING A MARK I REVERSICAL, REENTRY CAPSULE.

1.2. FIRST STAGE, THIOKOL TE-18, SERIAL NO. 174, MODIFIED TO UTILIZE SUBCONTRACT ADAPTER.

1.3. COMBINATION LAUNCH WEIGHT, 114,355 POUNDS.

2. DATE AND TIME OF LAUNCH, JUNE 3, 1959 AT 1309:21

SPECIAL INSTRUCTIONS

CLASSIFICATION CHANGED TO [redacted]

By Authority of DOSTR2 By [illegible] APR 1968

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| DATE | TIME |
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| 4 | 1800 |
| MONTH | YEAR |
| JUN | 1959 |

WRITER

SYMBOL

[redacted]

TYPED NAME AND TITLE (Signature if required)

WILLIAM F. [redacted], Lt. Col., USAF

PHONE [redacted] NO. 1 OF PAGES 7

SECURITY CLASSIFICATION [redacted]

RELEASER

SIGNATURE

TYPED (or stamped) NAME AND TITLE [redacted]

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM: CHIEF, AFBMS FIELD OFFICE, VANDENBERG AFB, CALIF [redacted]

3. PRIMARY OBJECTIVES

3.1. THE VEHICLE COMBINATION MUST PLACE IN ORBIT A DISCOVERER EARTH SATELLITE WHICH CONTAINS A BIOMEDICAL CAPSULE CAPABLE OF RETURNING TEST DATA WHILE ON ORBIT AND OF RE-ENTRY, ON COMMAND, TO BE RECOVERED FOR DIRECT EXAMINATION.

3.2. THE LAUNCH MONITOR AND CONTROL EQUIPMENT, CHECKOUT EQUIPMENT, AND GROUND HANDLING AND SERVICING EQUIPMENT MUST PROVIDE ADEQUATE SUPPORT AND CHECKOUT REQUIRED FOR LAUNCH OF THE DISCOVERER. IN ADDITION, ADEQUATE LAUNCH SUPPORT MUST BE PROVIDED AS REQUIRED BY THE BIOMEDICAL RECOVERY CAPSULE PRIOR TO AND INCLUDING LAUNCH OF THE DISCOVERER.

3.3. THE THOR FIRST STAGE SYSTEM MUST LAUNCH, CONTROL AND SEPARATE FROM THE DISCOVERER VEHICLE WITH AT LEAST THE MINIMUM PERFORMANCE SPECIFIED IN DRAWING DOCUMENTS. THE THOR AUTOPILOT MUST DEMONSTRATE ITS ABILITY TO CONTROL THE VEHICLE COMBINATION TO THE SEPARATION POINT WITHIN AN ACCEPTABLE DEGREE OF ACCURACY PLUS OR MINUS 4 DEGREES IN FLIGHT PATH ANGLE.

3.4. THE DISCOVERER AIRFRAME AND ADAPTER MUST DEMONSTRATE ITS ABILITY TO WITHSTAND CONTROL SYSTEM PERFORMANCES AND FLIGHT ENVIRONMENT.

3.5. THE DISCOVERER PROPULSION SYSTEM MUST DEMONSTRATE THE FOLLOWING:

A. IGNITION OF THE ENGINE (BELL MODEL NO. [illegible]) IN A VACUUM.

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FROM: [illegible] [redacted]

B. [illegible]

C. [illegible]

3.6. [illegible]

3.7. [illegible]

A. [illegible]

B. [illegible]

C. [illegible]

3.8. [illegible]

A. [illegible]

B. [illegible]

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JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM:

CHIEF, AFTRO FIELD OFFICE, VANDENBERG AFB, CALIF [redacted]

C. SEND THE COMMAND TO ADJUST THE SUBSYSTEM B TIMER TO INITIATE AND TERMINATE ORBITAL BOOST AND TO INITIATE CAPSULE RECOVERY AT THE PROPER TIME.

D. DETERMINE AN EMERGENCY OF ORBIT SUFFICIENTLY ACCURATE TO ASSURE ACQUISITION ON EACH SUCCESSING INTERCEPT AND TO ALLOW THE VEHICLE TIMER TO BE ADJUSTED WITH SUFFICIENT ACCURACY TO PROGRAM THE REQUIRED VEHICLE FUNCTIONS.

4. SECONDARY OBJECTIVES ARE TO TEST AND EVALUATE THE FOLLOWING:

A. SATELLITE SYSTEMS AND STRUCTURE AND THEIR EFFECTIVE FUNCTIONAL INTERRELATIONSHIPS.

B. TEMPERATURES AT SUFFICIENT LOCATIONS ON THE VEHICLE SO THAT THE HEAT-FLOW PATTERNS ESTABLISHED IN THEORETICAL DESIGN CAN BE VERIFIED AND THE TEMPERATURE ENVIRONMENT FOR LATER FLIGHTS ESTABLISHED.

C. INTERSTATION COMMUNICATIONS ENDURE.

D. ACQUISITION OF THE SATELLITE AT ANY ONE STATION BY MEANS OTHER THAN RADAR, AND ORBIT PREDICTION WITH ONLY AZIMUTH AND ELEVATION INFORMATION FOR ANY GIVEN INTERCEPT.

D. AEROLOGISTIC INTEGRITY OF THE DISCOVERER/THOR COMBINATION WITHIN THE LIMIT OF OPTICAL TRACKING CAPABILITY.

5. TERTIARY FLIGHT TEST OBJECTIVES. TERTIARY FLIGHT TEST OBJECTIVES ARE TO TEST AND EVALUATE THE CREW PROFICIENCY AND GROUND EQUIPMENT DESIGN FROM THE HUMAN ENGINEERING POINT OF VIEW.

6. DESCRIPTION OF THE ACCOMPLISHMENT OF THE TEST OBJECTIVES.

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SECURITY CLASSIFICATION [redacted]

FROM: AFTED FIELD OFFICE, VANDENBERG AFB, CALIFORNIA [redacted]

6.1. PRIMARY OBJECTIVE 3.1 RESULTS: AT THIS TIME NO VERIFICATION OF SHEET HAS BEEN OBTAINED.

6.2. PRIMARY OBJECTIVE 3.2 RESULTS: ALL GROUND SUPPORT EQUIPMENT OPERATED SATISFACTORY TO PROVIDE CHECKOUT AND LAUNCH OF THE DISCOVERER.

6.3. PRIMARY OBJECTIVE 3.3 RESULTS: MINIMUM PERFORMANCE OF THE THOR FIRST STAGE WILL REQUIRE REDUCTION AND ANALYSIS OF THE PRELIMINARY TELEMETRY DATA AND IS UNKNOWN AT THIS TIME. THOR AUTOPILOT PERFORMANCE WILL LIKEWISE REQUIRE TELEMETRY ANALYSIS.

6.4. PRIMARY OBJECTIVE 3.4 RESULTS: THE DISCOVERER AIRFRAME AND ADAPTER SUCCESSFULLY DEMONSTRATED ITS ABILITY TO WITHSTAND CONTROL SYSTEM PERFORMATIONS AND FLIGHT ENVIRONMENT.

6.5. PRIMARY OBJECTIVE 3.5 RESULTS:

A. DISCOVERER IGNITION SUCCESSFULLY OCCURED AT T + 313 SECONDS FOLLOWING LIFT OFF.

B. DISCOVERER DOCKET ENGINE IMPULSE IS UNKNOWN AND WILL REQUIRE DATA EVALUATION.

C. DISCOVERER PROPELLANT UTILIZATION APPEARS NOMINAL WITH AN ENGINE BURNING TIME OF APPROXIMATELY 115 SECONDS.

6.6. PRIMARY OBJECTIVE 3.6 RESULTS: DISCOVERER AUXILIARY POWER UNIT, BATTERIES, AND INVERTER PERFORMED NORMALLY FOR THE LAUNCH PHASE. GENERAL PERFORMANCE IS UNKNOWN AT THIS TIME.

6.7. PRIMARY OBJECTIVE 3.7 RESULTS:

A. THE REEVES COMPUTATION EQUIPMENT APPARENTLY GAVE

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FROM: [redacted]

AMMO FIELD OFFICE, [redacted] AFB, CALIF

CORRECT COMMANDS TO THE DISCOVERER. AT THIS TIME AIRBORNE VERIFICATION OF COMMAND RECEIPT AND EXECUTION IS UNKNOWN.

B. INITIATION AND TERMINATION OF ORBITAL BOOST AS INDICATED BY THE ENGINE BURNING TIME ARE APPARENTLY NORMAL. HOWEVER, QUICK LOOK DATA INDICATES THAT INJECTION VELOCITY WAS APPROXIMATELY 1500 FEET PER SECOND LESS THAN NOMINAL.

C. DISCOVERER VEHICLE ORIENTATION DURING COAST, ORBITAL BOOST, AND ORBIT PHASES WILL NOT BE KNOWN UNTIL PRELIMINARY ANALYSIS OF THE TELEMETRY DATA HAS BEEN ACCOMPLISHED.

6.8. PRIMARY OBJECTIVE 3.5 RESULTS:

A. GOOD TELEMETRY RECORDS WERE RECEIVED BY ALL TRACKING STATIONS DURING LENGTH PHASE.

B. QUICK LOOK DATA INDICATES RECEIPT OF ALL GROUND COMMANDS. MISSILE REACTION TO THESE COMMANDS IS UNKNOWN PENDING TELEMETRY DATA ANALYSIS.

C. DISCOVERER RESPONSE TO THE ORBITAL BOOST INITIATION AND TERMINATION COMPRESS TO ADJUST SUBSYSTEM D TIMER IS UNKNOWN PENDING TELEMETRY ANALYSIS. CAPSULE RECOVERY INFORMATION IS NOT AVAILABLE AT THIS TIME.

D. EXECUTION OF ORBIT INFORMATION IS UNKNOWN DUE TO NO ORBIT VERIFICATION.

7. SECONDARY OBJECTIVE RESULTS:

A. SATELLITE SYSTEMS AND STRUCTURES ARE UNKNOWN DUE TO NO ORBIT VERIFICATION.

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[redacted]

FROM:

AFSND FIELD OFFICE, VANDENBERG AFB, CALIFORNIA [redacted]

B. TEMPERATURE DATA WILL REQUIRE DETAILED TELEMETRY ANALYSIS.

C. SATELLITE ACQUISITION HAS NOT BEEN CONFIRMED AT THIS TIME.

D. AERODYNAMIC INTEGRITY OF THE DISCOVERER/TKR COMBINATION WAS SUCCESSFULLY DEMONSTRATED DURING THE LAUNCH PHASE.

8. TERTIARY OBJECTIVE RESULTS WERE ACCOMPLISHED SATISFACTORILY.

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JOINT MESSAGEFORM

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| INFO PRIORITY IMMEDIATE | | | X | | | |

FROM:

CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIF

TO:

COMDR AFBMD, HEDARDC, LOS ANGELES 45, CALIF

LOCKHEED MISSILES AND SPACE DIVISION, ~~PALO ALTO~~ VAFB, CALIF

Hq, 6594th Aerospace Wing

AFBMD FIELD OFFICE, PALO ALTO, CALIF

DOUGLAS AIRCRAFT COMPANY, ~~SANTA MONICA~~ VAFB, CALIF

INFO: 1ST MISSILE DIVISION, VANDENBERG AFB, CALIF (COURIER)

~~SECRET~~/FROM WDGEV—NSJ—59. LOS ANGELES FOR WDZW. LOCKHEED FOR DEPARTMENT 61-44 AND 61-70. SUBJECT: FLASH REPORT OF LAUNCHING OF DISCOVERER NO. 4 (1023/179) FROM VANDENBERG AFB.

1. DISCOVERER NO. 4 (1023/179) WAS LAUNCHED FROM PAD #5 OF THE 75-3 COMPLEX 25 JUNE 1959 AT 15:47:46 PDT.

2. AT THIS TIME NO VERIFICATION OF ORBIT HAS BEEN OBTAINED.

3. ALL GROUND SUPPORT EQUIPMENT OPERATED SATISFACTORILY TO PROVIDE CHECKOUT AND LAUNCH OF THIS DISCOVERER. HOWEVER, AT THE START OF FUEL LOADING OF THE ORBITING VEHICLE A SLIDING INTERFLOW VALVE IN THE FUEL LINE AT THE QUICK DISCONNECT FAILED TO FUNCTION PROPERLY. IT WAS NECESSARY TO SEND TWO MEN UP TO THIS VALVE IN A HIGH-LIFT TO TAP THE VALVE HOUSING WITH A MALLET. THIS PROCEDURE UNSEATED THE

SPECIAL INSTRUCTIONS

CLASSIFICATION CHANGED TO [redacted]

DOWNGRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER 12 YEARS DOD DIRECTIVE 5200.10

By Authority of 295-2 Gordon McCutchen 4 APR '66

| DATE | TIME |
|---|---|
| 25 | 2100 |
| MONTH 6 | YEAR 59 |

SYMBOL WDGEVR

WRITER

WILLIAM F. HEISLER, LT COL, USAF

TYPED NAME AND TITLE (Signature, if required)

William F. Heisler

PHONE 8-3122 | PAGE NO. 1 | NO. OF PAGES

SECURITY CLASSIFICATION [redacted]

RELEASER

SIGNATURE

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[redacted]

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

2

FROM: CHIEF, AFMDC FIELD OFFICE, VANDENBERG AFB, CALIF [redacted]

VALVE AND THE FUEL LOADING PROCEEDED WITH NO FURTHER DIFFICULTIES.

4. A QUICK LOOK ANALYSIS OF THOR PERFORMANCE AT BURNOUT INDICATES AZIMUTH WAS APPROXIMATELY TWO DEGREES WEST AND ALTITUDE WAS 40,000 FEET LOW. HYDRAULICS AND CONTROL SYSTEM PERFORMED SATISFACTORILY. PROGRAMMED TIMES APPEAR NORMAL BUT FURTHER ANALYSIS MUST BE PERFORMED TO ACCURATELY DETERMINE TRAJECTORY. THE OSCILLATION NOTED ON PREVIOUS LAUNCHES WAS AGAIN PRESENT. THRUST DEVELOPED 151,000 POUNDS. PROPELLANT LOADING WAS THREE GALLONS SHORT WHICH IS WELL WITHIN TOLERANCE. THE UMBILICAL MAST DID NOT FIRE. HOWEVER, NO APPARENT DAMAGE TO THE MISSILE OR GSE RESULTED FROM THIS MALFUNCTION.

5. THE DISCOVERER AIRFRAME AND ADAPTER SUCCESSFULLY DEMONSTRATED ITS ABILITY TO WITHSTAND CONTROL SYSTEM PERTURBATIONS AND FLIGHT ENVIRONMENT.

6. THE DISCOVERER ENGINE SUCCESSFULLY IGNITED AT T+241 SECONDS FOLLOWING LIFT OFF. ENGINE IMPULSE IS UNKNOWN AT THIS TIME. PROPELLANT UTILIZATION H APPEARS NORMAL WITH AN ENGINE BURNING TIME OF 135.7 SECONDS. HOWEVER, A QUICK LOOK ANALYSIS INDICATES THAT THE ENGINE SHUT DOWN AS A RESULT OF FUEL DEPLETION RATHER THAN AS A RESULT OF A COMMAND FROM GUIDANCE. INTEGRATOR OPERATION APPEARS ABNORMAL.

7. DISCOVERER AUXILIARY POWER UNIT, BATTERIES, AND INVERTER PERFORMED NORMALLY H FOR THE LAUNCH PHASE. ORBITAL PERFORMANCE IS UNKNOWN AT THIS TIME.

8. THE REMOTE COMMUTATIONAL EQUIPMENT APPARENTLY GAVE [redacted]

DOWNGRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER 12 YEARS DOD DIRECTIVE 5200.10

| SYMBOL | PAGE NR | NR OF PAGES | SECURITY CLASSIFICATION | INITIALS |
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| WDGEVR | 2 | [redacted] | [redacted] | [illegible] |

DD FORM 172 1

CORRECT COMMANDS TO THE DISCOVERER. AT THIS TIME AIRBORNE VERIFICATION OF COMMAND RECEIPT AND EXECUTION IS UNKNOWN. INITIATION AND TERMINATION OF ORBITAL BOOST AS INDICATED BY ENGINE BURNING TIME ARE APPARENTLY NORMAL. VEHICLE ORIENTATION DURING COAST, ORBITAL BOOST, AND ORBIT WILL NOT BE KNOWN UNTIL PRELIMINARY ANALYSIS OF THE TELEMETRY DATA HAS BEEN ACCOMPLISHED. PRELIMINARY ANALYSIS INDICATES ALTITUDE AT BURNOUT WAS 112 STATUTE MILES, THE VELOCITY WAS 25,200 FT/SEC, AND THE INJECTION ANGLE APPROXIMATELY ZERO DEGREES.

9. COMMAND COMPONENTS FUNCTIONED AS FOLLOWS:

A. GOOD TELEMETRY RECORDS WERE RECEIVED BY VANDENBERG TRACKING STATION DURING LAUNCH PHASE.

B. QUICK LOOK DATA INDICATES RECEIPT OF ALL GROUND COMMANDS. MISSILE RESPONSE AND VERIFICATION REQUIRE FURTHER ANALYSIS.

C. ADJUSTMENT OF SUBSYSTEM "D" TIMER IS UNKNOWN AS APPARENTLY NO ORBIT WAS ACHIEVED. HOWEVER, BASIC "D" TIMER FUNCTIONS DURING EXIT PHASE APPEAR NORMAL.

D. EPHEMERIS OF ORBIT INFORMATION IS UNKNOWN AS NO ORBIT VERIFICATION HAS BEEN OBTAINED.

10. NO RECOVERY OBJECTIVES HAVE BEEN ASCERTAINED AS ORBIT IS NOT VERIFIED.

11. THE FOLLOWING INFORMATION IS AVAILABLE ON ACHIEVEMENT OF SECONDARY OBJECTIVES:

A. SATELLITE SYSTEMS AND STRUCTURES ARE UNKNOWN DUE TO NO ORBIT VERIFICATION.

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JOINT MESSAGEFORM - CONTINUATION SHEET

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FROM: CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIF

B. TEMPERATURE DATA WILL REQUIRE DETAILED TELEMETRY ANALYSIS.

C. INTERSTATION COMMUNICATION NETWORK PERFORMED SATISFACTORILY.

D. SATELLITE ACQUISITION NOT CONFIRMED AT THIS TIME.

E. AERODYNAMIC INTEGRITY OF THE DISCOVERER/THOR COMBINATION WAS SUCCESSFULLY DEMONSTRATED DURING THE LAUNCH PHASE.

12. TERTIARY OBJECTIVES WERE ACCOMPLISHED SATISFACTORILY.

13. TOTAL HOLD TIME DURING COUNTDOWN WAS FOUR HOURS FORTY-SEVEN MINUTES FOR THE FOLLOWING REASONS:

A. LEAK IN THE GASEOUS LIQUID OXYGEN MISSILE FILLLINE OF THE FIRST STAGE.

B. FAILURE OF THE ORBITING VEHICLE BEACON TO SUCCESSFULLY COMPLETE CHECKOUT.

C. STICKING INTERFLOW VALVE IN THE ~~DUCE~~ FUEL LINE TO THE ORBITING VEHICLE.

14. THE FOLLOWING EVENTS OCCURRED AT THE TIMES NOTED:

| | |
|---|---|
| LIFT OFF | 15:47:46 PDT |
| MECO | 158.7" |
| VECO | 168.0" |
| SEPARATION | 172.4" |
| ORBITAL STAGE IGNITION | 241" |
| ORBITAL STAGE BURNOUT | 356.7" |

15. DURING THE EXIT PHASE, A ZERO SECOND COMMAND FIVE AND A 14.4 SECOND COMMAND SIX WERE SENT.

16. PAD DAMAGE FOR BAC APPEARS TO BE SIMILAR TO PAST LAUNCHES WITH THE EXCEPTION THAT EXTENSIVE AIR CONDITIONING DAMAGE RESULTED.

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| WDGEVR | 4 | | [redacted] | [redacted] |

DD FORM 170 1

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM: CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIF [redacted]

THREE TV CABLES WERE BURNED OUT AS A RESULT OF A POST-LAUNCH FIRE. LMSD ELECTRICAL CABLES SUFFERED EXTENSIVE DAMAGE RESULTING FROM FIRE RUNNING DOWN THE AIR CONDITIONER DUCTING.

DOWNGRADED AT 3 YEAR INTERVALS
DECLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

| SYMBOL | PAGE NR. | NR OF PAGES | SECURITY CLASSIFICATION | INITIALS |
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| WDGEVR | 5 | | [redacted] | nab |

173-1

1029 492

JOINT MESSAGEFORM

SECURITY CLASSIFICATION [redacted]

File [redacted]

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| ACTION PRIORITY IMMEDIATE | BOOK | MULTI | SINGLE | | | |
| INFO PRIORITY IMMEDIATE | | | | | | |

FROM: CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIF

TO: COMDR AFBMD, HEDARDC, LOS ANGELES 45, CALIF, ATTN:WDZW

HQ 6594TH TEST WING, USAF, PALO ALTO, CALIF

LOCKHEED MISSILES AND SPACE DIVISION, VAFB, CALIF(COURIER)

DOUGLAS AIRCRAFT COMPANY, VAFB, CALIF(COURIER)

INFO:1ST MISSILE DIVISION, VANDENBERG AFB, CALIF(COURIER)

SECRET FROM WDGEV 8-74-C. LOSA FOR WDZW. LOCKHEED FOR DEPT 61-44 & 61-70. SUBJECT: FLASH REPORT OF LAUNCHING OF DISCOVERER NO. 5 FROM VANDENBERG AFB.

1. VEHICLE CONFIGURATION

1.1. SATELLITE VEHICLE, LOCKHEED, XA MODEL 2205, SERIAL NO. 1029, SEPARATION WEIGHT 8473 POUNDS.

1.2. FIRST STAGE, THOR DM-18, SERIAL NO. 192, MODIFIED TO UTILIZE STRUCTURAL ADAPTER.

2. DATE AND TIME OF LAUNCH, AUGUST 13, 1959 AT 12:00:00 PST, INTO A POLAR ORBIT ON AN ORBIT INJECTION AZIMUTH OF 170°.

SPECIAL INSTRUCTIONS

CLASSIFICATION CHANGED TO [redacted]

By Authority of 205-2

By [signature] APR 1956

DOWNGRADED AT 3 YEAR INTERVALS
D. CLASSIFIED AFTER 12 YEARS
DOD DIRECTIVE 5200.10

| DATE | TIME |
|---|---|
| 13 | |
| AUGUST | YEAR 1959 |

WRITER

SYMBOL: WDGEVR

TYPED NAME AND TITLE (Signature, if required): WILLIAM F. HEISLER, Lt Col, USAF

PHONE 8-5147 | PAGE NR. 1 | NR. OF PAGES

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SIGNATURE

TYPED (or stamped) NAME AND TITLE

DD FORM 1 MAY 55 173 REPLACES DD FORM 173, 1 OCT 49, WHICH WILL BE USED UNTIL EXHAUSTED

Cy #5 of 6 cys

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION

FROM:

CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIFORNIA [redacted]

3. PRIMARY OBJECTIVES. SEE DTO 9 FOR ALL OBJECTIVES.

3.1. THE VEHICLE COMBINATION MUST PLACE IN ORBIT A DISCOVERER EARTH SATELLITE WHICH CONTAINS A BIOMEDICAL CAPSULE CAPABLE OF RETURNING TEST DATA WHILE ON ORBIT AND OF RE-ENTRY, ON COMMAND, TO BE RECOVERED FOR DIRECT EXAMINATION.

all corrections in red WDGEV-10-3710 "Air Force" attached was recoverable capsule not biomedical as

3.2. THE LAUNCH MONITOR AND CONTROL EQUIPMENT, CHECKOUT EQUIPMENT, AND GROUND HANDLING AND SERVICING EQUIPMENT MUST PROVIDE ADEQUATE SUPPORT AND CHECKOUT REQUIRED FOR LAUNCH OF THE DISCOVERER. IN ADDITION, ADEQUATE LAUNCH SUPPORT MUST BE PROVIDED AS REQUIRED BY THE BIOMEDICAL RECOVERY CAPSULE PRIOR TO AND INCLUDING LAUNCH OF THE DISCOVERER.

3.3. THE THOR FIRST STAGE SYSTEM MUST LAUNCH, CONTROL AND SEPARATE FROM THE DISCOVERER VEHICLE WITH AT LEAST THE MINIMUM PERFORMANCE SPECIFIED IN DESIGN DOCUMENTS. THE THOR AUTOPILOT MUST DEMONSTRATE ITS ABILITY TO CONTROL THE VEHICLE COMBINATION TO THE SEPARATION POINT WITHIN AN ACCEPTABLE DEGREE OF ACCURACY (PLUS OR MINUS 4 DEGREES IN FLIGHT PATH ANGLE).

3.4. THE DISCOVERER AIRFRAME AND ADAPTER MUST DEMONSTRATE ITS ABILITY TO WITHSTAND CONTROL SYSTEM SYMMETRY PERTURBATIONS AND FLIGHT ENVIRONMENT.

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Cy # 5 - & 6 cys

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM:

CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIFORNIA [redacted]

3.5. THE DISCOVERER PROPULSION SYSTEM MUST DEMONSTRATE THE FOLLOWING:

A. IGNITION OF THE ENGINE BELL MODEL NO. 8048 IN A VACUUM.

B. ABILITY OF THE ROCKET ENGINE TO PROVIDE THE TOTAL IMPULSE REQUIRED TO ATTAIN ORBITAL VELOCITY.

C. PROPER PROPELLANT UTILIZATION.

3.6. THE DISCOVERER AUXILLIARY POWER UNIT MUST DEMONSTRATE ACCEPTABLE PERFORMANCE OF ITS COMPONENTS, ESPECIALLY BATTERIES AND INVERTERS.

3.7. THE DISCOVERER GUIDANCE AND CONTROL SYSTEM MUST DEMONSTRATE THE ABILITY OF ITS COMPONENTS TO:

A. DERIVE THE TIME TO INITIATE ORBITAL BOOST AND THE VELOCITY TO BE GAINED DURING ORBITAL BOOST USING THE REEVES COMPUTATION EQUIPMENT.

B. INITIATE AND TERMINATE ORBITAL BOOST AT THE PROPER TIME.

C. MAINTAIN PROPER VEHICLE ORIENTATION DURING THE COAST, ORBITAL BOOST AND ORBITING PHASES UNTIL THE EJECTION OF THE REC. (INCLUDING PROPER FUNCTION OF THE SUBSYSTEM D COMPUTER, INERTIAL REFERENCE PACKAGE, HORIZON SCANNER, PNEUMATIC CONTROL SYSTEM, AND HYDRAULIC

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Cy #5 of 6 cys

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM:

CHIEF, AFMD FIELD OFFICE, VANDENBERG AFB, CALIF [redacted]

CONTROL SYSTEM.

3.B. AIRBORNE AND GROUND TELEMETRY, TRACKING AND COMMAND SYSTEMS MUST DEMONSTRATE THE ABILITY OF THESE COMPONENTS TO:

A. SATISFACTORILY MONITOR ALL PRIMARY VEHICLE FUNCTIONS (TIDR AND DISCOVERER) AND PRODUCE ADEQUATE GROUND TELEMETRY RECORDS OF THESE FUNCTIONS.

B. PROPERLY RECEIVE, ACT UPON, AND VERIFY ALL GROUND SPACE COMMANDS, AND ENSURE THAT NO FALSE COMMANDS ARE ACTED UPON.

C. SEND THE COMMAND TO ADJUST THE SUBSYSTEM D TIMER AND INITIATE AND TERMINATE ORBITAL BOOST AND TO INITIATE CAPSULE RECOVERY AT THE PROPER TIME.

D. DETERMINE AN EPHEMERIS OF ORBIT SUFFICIENTLY ACCURATE TO ASSURE ACQUISITION ON EACH SUCCEEDING INTERCEPT AND TO ALLOW THE VEHICLE TIMER TO BE ADJUSTED WITH SUFFICIENT ACCURACY TO PROGRAM THE REQUIRED VEHICLE FUNCTIONS.

4. PRIMARY OBJECTIVE TO ATTAIN AN ORBIT WAS SATISFACTORILY ACHIEVED AS RECORDED BY ACQUISITION ON ALL TRACKING AIDS AT KODIAK, ANSETTE AND VAFB ON THE FIRST PASS.

~~4.1. PRIMARY OBJECTIVE OF ATTAINMENT OF ORBIT COMPLETI-~~

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| WDGRVR | 4 | | [redacted] | |

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Cy #5 of 6 Cys

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM:

CHIEF, AFBMD PO, VANDENBERG AFB, CALIFORNIA [redacted]

4.1. PRIMARY OBJECTIVE OF EVALUATION OF GSE COMPATIBILITY TO THE SATELLITE WAS DEMONSTRATED SATISFACTORILY [redacted] BY THE SUCCESSFUL LAUNCH. SOME GSE PROBLEMS WERE EXPERIENCED BUT ALL WERE CORRECTED.

4.2. PRIMARY OBJECTIVE OF THE FIRST STAGE VEHICLE TO PROVIDE SATELLITE BOOST SO AS TO ACHIEVE AN ORBIT WAS SATISFACTORILY DEMONSTRATED. MAIN ENGINE BURNING TIME WAS 115 SECONDS WITH VERNIER CUTOFF 6 SECONDS LATER.

4.3. PRIMARY OBJECTIVE OF SATELLITE AIRFRAME TO MEET ENVIRONMENTAL CONDITIONS WAS SATISFACTORILY DEMONSTRATED BY SUCCESSFUL OPERATION OF TRACKING AIDS ON FIRST PASS INDICATING STRUCTURAL INTEGRITY. SEPARATION OCCURRED 8 SECONDS AFTER VERNIER CUTOFF.

4.4. PRIMARY OBJECTIVE OF SATELLITE PROPULSION SYSTEM TO PROVIDE VACUUM IGNITION, TOTAL IMPULSE AND PROPELLANT UTILIZATION WAS SATISFACTORILY DEMONSTRATED BY SECOND STAGE IGNITION AFTER A COAST PERIOD OF 115 SECONDS AFTER SEPARATION. THE BURNING TIME 115 SECONDS AS PROGRAMMED, INDICATING PROPER PROPELLANT UTILIZATION. TOTAL IMPULSE DESIRED WAS OBTAINED AS INDICATED BY FIRST ORBIT PASS ON PREDICTED TIME. THE ESTIMATED BURNOUT VELOCITY BASED ON [illegible] DATE WAS [redacted]

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SYMBOL | CLASSIFICATION | INITIALS

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Cy #5 of 6 Cys

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SECURITY CLASSIFICATION [redacted]

FROM:

CHIEF, AFSMD FIELD OFFICE, VANDENBERG AFB, CALIFORNIA [redacted]

25,875 1,360

[illegible] FT/SECOND.

4.6. PRIMARY OBJECTIVE OF GUIDANCE SYSTEM TO INITIATE AND TERMINATE BOOST AND CONTROL VEHICLE ORIENTATION WAS SATISFACTORILY DEMONSTRATED BY ACHIEVEMENT OF ORBIT IN AN EPHEMERIS WHICH IS NOT YET ACCURATELY DETERMINED. GUIDANCE VALUES ARE YET TO BE OBTAINED FROM TELEMETRY.

4.7. PRIMARY OBJECTIVE OF THE GROUND SPACE COMMUNICATIONS SYSTEM TO FUNCTION PROPERLY AND COMMAND AS REQUIRED WAS DEMONSTRATED SATISFACTORILY. ACQUISITION WAS ACHIEVED WHEN PREDICTED.

5.0. ALL SECONDARY OBJECTIVES WERE ACHIEVED. DETAILS ARE DEPENDENT UPON TELEMETRY REDUCTION.

6.0. ALL TERTIARY OBJECTIVES WERE ACHIEVED.

7.0. THE FOLLOWING ADDITIONAL INFORMATION IS SUBMITTED:

A. TLM-18 TRACKED FOR [illegible] SEC.

B. VAFB RADAR TRACKED FOR [illegible] SEC.

C. [illegible]

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| WDGEVR | 6 | | [redacted] | [illegible] |

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JOINT MESSAGEFORM

SECURITY CLASSIFICATION

[redacted]

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Vehicle #29

| PRECEDENCE | TYPE MSG (Check) | | | ACCOUNTING SYMBOL | ORIG. OR REFERS TO | CLASSIFICATION OF REFERENCE |
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| ACTION PRIORITY IMMEDIATE | BOOK | MULTI | SINGLE | | | |
| INFO PRIORITY IMMEDIATE | | | | | | |

FROM:

CHIEF, AFIMD FIELD OFFICE, VANDENBERG AFB, CALIF

TO:

COMDR, AFIMD, HEDAEDC, ATTN: WDZW

HQ 6594TH TEST WING, PALO ALTO, CALIF

LOCKHEED MISSILES AND SPACE DIVISION, VAFB (COURIER)

DOUGLAS AIRCRAFT COMPANY, VAFB (COURIER)

INFO: 1ST MISSILE DIVISION, VAFB (COURIER)

SECRET FROM WDGEV 60-3710. LOSA FOR WDZW. LOCKHEED FOR DEPT 61-44 AND 61-70. SUBJECT: CORRECTION OF FLASH REPORT OF LAUNCHING OF DISCOVERER NO. 5 (1029) FROM VANDENBERG AFB. AN ERROR WAS MADE IN THE FLASH REPORT ON DISCOVERER NO. 5. MESSAGE NUMBER WDGEV 8-74-C. THE CAPSULE WAS A "RECOVERABLE" CAPSULE, NOT A "BIOMEDICAL CAPSULE" AS STATED. THEREFORE, DELETE THE WORD "BIOMEDICAL" WHEREVER IT OCCURS AND SUBSTITUTE "RECOVERABLE".

SPECIAL INSTRUCTIONS

CLASSIFICATION CHANGED TO [redacted]

By Authority of 905-2

Lyman M. Johnson 4 APR 1966

DOWNGRADED AT 3 YEAR INTERVALS; DECLASSIFIED AFTER 12 YEARS. DOD DIRECTIVE 5200.10

| DATE | TIME |
|---|---|
| 21 | |
| MONTH | YEAR |
| AUG | 1959 |

WRITER

SYMBOL

TYPED NAME AND TITLE (Signature if required)

[signature]

WILLIAM F. KEHLER, 1st Col, USAF

SECURITY CLASSIFICATION

[redacted]

RELEASER

SIGNATURE

TYPED (or stamped) NAME AND TITLE

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FROM: PRIORITY IMMEDIATE
PRIORITY IMMEDIATE
CHIEF, AFSMD FIELD OFFICE, VANDENBERG AFB, CALIF

TO: COMOR AFSMD, NEDARDC, LOS ANGELES 45, CALIF. ATTN: WDGEV
DC 6594TH TEST WING, USAF, PALO ALTO, CALIF
LOCKHEED MISSILES AND SPACE DIVISION, VAFB, CALIF(COURIER)
DOUGLAS AIRCRAFT COMPANY, VAFB, CALIF(COURIER)
INFO: ST MISSILE DIVISION, VANDENBERG AFB, CALIF(COURIER)

SECRET FROM WDGEV 8-101-C LOSA FOR WDGEV. LOCKHEED FOR DEPT 61-44 & 61-70. SUBJECT: FLASH REPORT OF LAUNCHING OF DISCOVERER NO. 6 FROM VANDENBERG AFB.

1. VEHICLE CONFIGURATION

1.1. SATELLITE VEHICLE, LOCKHEED, XA MODEL 2205, SERIAL NO. 1003, SEPARATION WEIGHT 2,267 POUNDS.

1.2. FIRST STAGE, THOR DM-18, SERIAL NO. 200, MODIFIED TO UTILIZE STRUCTURAL ADAPTER.

2. DATE AND TIME OF LAUNCH, AUGUST 19, 1959 AT 12:24:44 PST, INTO A POLAR ORBIT ON AN ORBIT INJECTION AZIMUTH OF 177°

SPECIAL INSTRUCTIONS

CLASSIFICATION CHANGED TO [redacted]
By Authority of [illegible]
[illegible] APR 1966
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| DATE | TIME |
|---|---|
| | YEAR |
| AUGU | 1959 |

SYMBOL: WDGEV

TYPED NAME AND TITLE (Signature, if required): WILLIAM F. [illegible], Lt Col, USAF

PHONE: [illegible] | PAGE NO. | NO. OF PAGES 6

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TYPED (or stamped) NAME AND TITLE

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FROM: CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIFORNIA

2. PRIMARY OBJECTIVES. SEE DTO 58 & 59 FOR ALL OBJECTIVES.

3.1. DISCOVERER SATELLITE AIRFRAME AND ADAPTER. THE DISCOVERER AIRFRAME MUST DEMONSTRATE ITS COMPATABILITY WITH A GIMBAL-MOUNTED, SWIVELING, BURNING ROCKET MOTOR AND WITH FLIGHT ENVIRONMENT.

3.2. DISCOVERER SATELLITE PROPULSION SYSTEM

THE DISCOVERER PROPULSION SYSTEM MUST DEMONSTRATE THE FOLLOWING:

A. IGNITION OF THE YLR-81-BA-5 ROCKET ENGINE IN A VACUUM

B. ABILITY OF THE ROCKET ENGINE TO PROVIDE THE TOTAL IMPULSE REQUIRED TO ATTAIN ORBITAL VELOCITY

C. PROPER PROPELLANT UTILIZATION

3.3. DISCOVERER SATELLITE APU SYSTEM

THE DISCOVERER AUXILIARY POWER UNIT MUST DEMONSTRATE ACCEPTABLE PERFORMANCE OF ITS COMPONENTS, ESPECIALLY BATTERIES AND INVERTERS.

3.4. DISCOVERER GUIDANCE AND CONTROL SYSTEM

THE DISCOVERER GUIDANCE AND CONTROL SYSTEM MUST DEMONSTRATE THE ABILITY OF ITS COMPONENTS TO:

A. DERIVE THE TIME TO INITIATE ORBITAL BOOST AND THE VELOCITY-TO-BE-GAINED DURING ORBITAL BOOST, USING THE

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Cy #6 of 6 cy

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION [redacted]

FROM:

CHIEF, AFSMC FIELD OFFICE, VANDENBERG AFB, CALIFORNIA

REEVES COMPUTATION EQUIPMENT

B. INITIATE AND TERMINATE ORBITAL BOOST AT THE PROPER TIME

C. MAINTAIN PROPER VEHICLE ORIENTATION DURING THE COAST, ORBITAL BOOST AND ORBITING PHASES UNTIL THE EJECTION OF THE RECOVERABLE CAPSULE (INCLUDING PROPER FUNCTION OF THE SUBSYSTEM D COMPUTER, INERTIAL REFERENCE PACKAGE, HORIZON SCANNER, PNEUMATIC CONTROL SYSTEM, AND HYDRAULIC CONTROL SYSTEM).

3.5. DISCOVERER SATELLITE TELEMETRY, TRACKING AND COMMAND EQUIPMENT

AIRBORNE AND GROUND TELEMETRY TRACKING AND COMMAND SYSTEMS MUST DEMONSTRATE THE ABILITY OF THEIR COMMAND COMPONENTS TO:

A. SATISFACTORILY MONITOR ALL PRIMARY VEHICLE FUNCTIONS (THOR AND DISCOVERER) AND PRODUCE ADEQUATE GROUND TELEMETRY RECORDS OF THESE FUNCTIONS

B. PROPERLY RECEIVE, ACT UPON, AND VERIFY ALL GROUND-SPACE COMMANDS, AND INSURE THAT NO FALSE COMMANDS ARE ACTED UPON

C. SEND THE COMMAND TO ADJUST THE SUBSYSTEM D TIMER TO INITIATE AND TERMINATE ORBITAL BOOST AT THE

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Cy # 6 of 6 cys

JOINT MESSAGEFORM - CONTINUATION SHEET

SECURITY CLASSIFICATION

[redacted]

FROM:

CHIEF, AFMD FIELD OFFICE, VANDENBERG AFB, CALIFORNIA

PROPER TIME

D. DETERMINE AN EPHEMERIS OF ORBIT SUFFICIENTLY ACCURATE TO ASSURE ACQUISITION ON EACH SUCCESSIVE INTERCEPT AND TO ALLOW THE VEHICLE TIMER TO BE ADJUSTED WITH SUFFICIENT ACCURACY TO PROGRAM THE REQUIRED VEHICLE FUNCTIONS

4. PRIMARY OBJECTIVE TO ATTAIN AN ORBIT WAS SATISFACTORILY ACHIEVED AS RECORDED BY ACQUISITION ON ALL TRACKING AIDS AT KODIAK, ANNETTE AND VAFB ON THE FIRST PASS.

4.1. PRIMARY OBJECTIVE OF EVALUATION OF GSE COMPATIBILITY TO THE SATELLITE WAS DEMONSTRATED SATISFACTORILY BY THE SUCCESSFUL LAUNCH. SOME GSE PROBLEMS WERER EXPERIENCED, BUT ALL WERE CORRECTED.

4.2. PRIMARY OBJECTIVE OF THE FIRST STAGE VEHICLE TO PROVIDE SATELLITE BOOST SO AS TO ACHIEVE AN ORBIT WAS SATISFACTORILY DEMONSTRATED. MAIN ENGINE BURNING TIME WAS 115 SECONDS WITH VERNIER CUT OFF 9 SECONDS LATER.

4.3. PRIMARY OBJECTIVE OF SATELLITE AIRFRAME TO MEET ENVIRONMENTAL CONDITIONS WAS SATISFACTORILY DEMONSTRATED BY SUCCESSFUL OPERATION OF TRACKING AIDS ON FIRST PASS INDICATING STRUCTURAL INTEGRITY. SEPARATION OCCURRED 8 SECONDS AFTER VERNIER CUTOFF

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FROM:

CHIEF, AFBMD FIELD OFFICE, VANDENBERG AFB, CALIFORNIA [redacted]

4.4. PRIMARY OBJECTIVE OF SATELLITE PROPULSION SYSTEM TO PROVIDE VACUUM IGNITION, TOTAL IMPULSE AND PROPELLANT UTILIZATION WAS SATISFACTORILY DEMONSTRATED BY SECOND STAGE IGNITION AFTER A COAST PERIOD OF 94 SECONDS AFTER SEPARATION. THE BURNING TIME IN SECONDS AS PROGRAMMED, INDICATED PROPER PROPELLANT UTILIZATION. TOTAL IMPULSE DESIRED WAS OBTAINED AS INDICATED BY FIRST ORBIT PASS ON PREDICTED TIME. THE ESTIMATED BURNOUT VELOCITY BASED ON MUGU RADAR DATA WAS ~~[illegible]~~ 25 600 ± 80 FT/SECOND.

4.6. PRIMARY OBJECTIVE OF GUIDANCE SYSTEM TO INITIATE AND TERMINATE BOOST AND CONTROL VEHICLE ORIENTATION WAS SATISFACTORILY DEMONSTRATED BY ACHIEVEMENT OF ORBIT IN AN EPHEMERIS WHICH IS NOT YET ACCURATELY DETERMINED. GUIDANCE VALUES ARE YET TO BE OBTAINED FROM TELEMETRY.

4.7. PRIMARY OBJECTIVE OF THE GROUND SPACE COMMUNICATIONS SYSTEM TO FUNCTION PROPERLY AND COMMAND AS REQUIRED WAS DEMONSTRATED SATISFACTORILY. ACQUISITION WAS ACHIEVED WHEN PREDICTED WITH ALL PARAMETERS READING OUT.

5.0. ALL SECONDARY OBJECTIVES WERE ACHIEVED. DETAILS ARE DEPENDENT UPON TELEMETRY REDUCTION.

6.0. ALL TERTIARY OBJECTIVES WERE ACHIEVED.

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FROM:

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7.8. THE FOLLOWING ADDITIONAL INFORMATION IS SUBMITTED:

A. TLM-IS TRACKED FOR 447 SEC.

B. VAFB RADAR was tracking TRACKED FOR 180 SEC. when it went passive.

All timing is approx. and unconfirmed until tapes are read

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